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JOURNAL
OF THE
ASIATIC SOCIETY OF BENGAL,

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VOL. XXVIII.

Nos. I. to V.—1859.

“It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish if such communications shall be long intermitted; and it will die away, if they shall entirely cease.”—

SIR WM. JONES.

CALCUTTA:

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1859.

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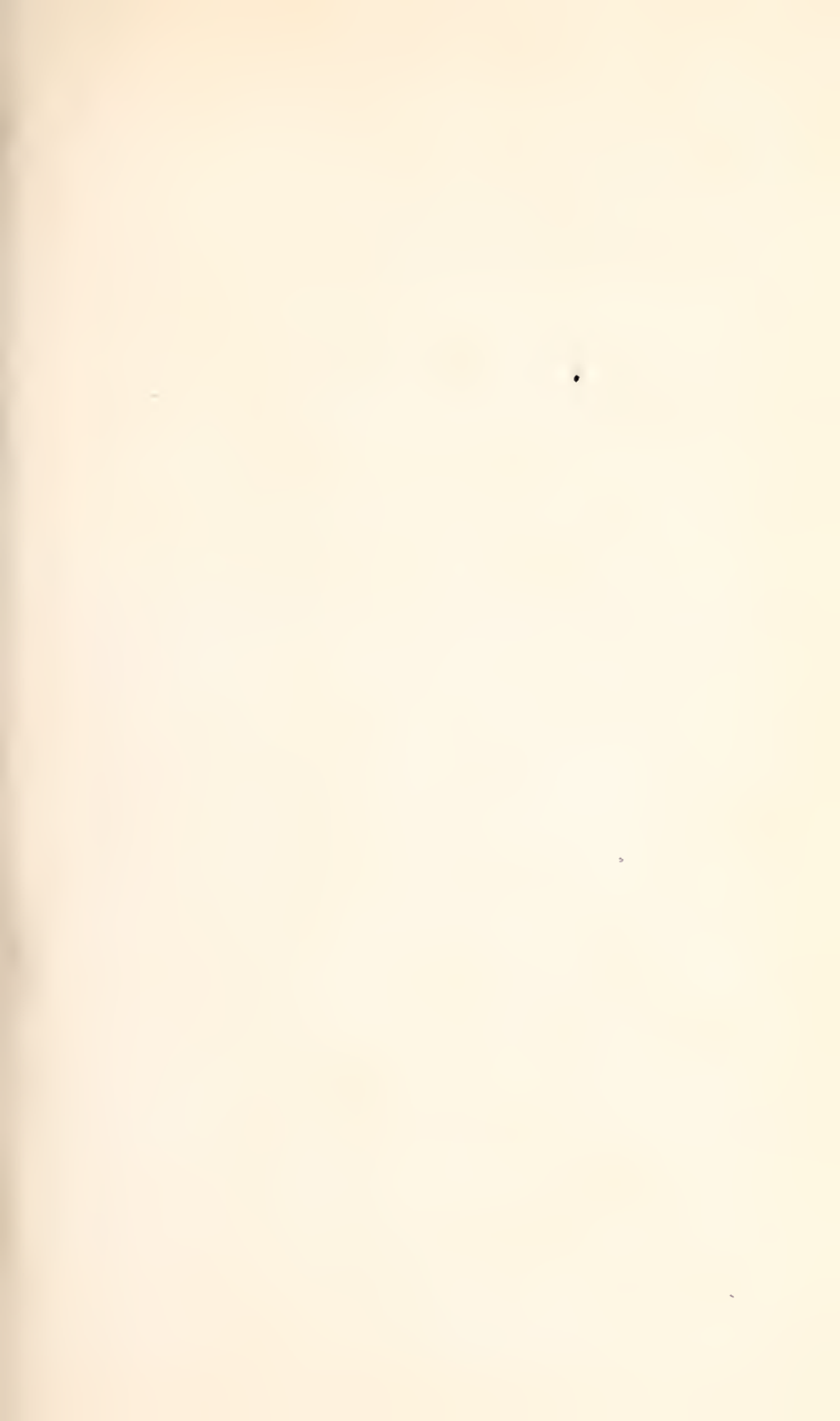
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JOURNAL
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No. I. 1859.  
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Decipherment of a Sanskrit Inscription dated in the fourteenth century, with a translation and notes.—By FITZ-EDWARD HALL, Esq. M. A.

The inscription here published was dug from the ruins of a temple in the village of Harsaudá, which lies about ten and a half miles from the town of Chárwá, in the district of Hoshungabad. I am indebted for it to Maulavi Muhammad Mazhar Jamil, the energetic Assistant Superintendent of Hurda and Hindia. The stone on which it is incised is now in my possession. A superficies measuring about eleven inches by thirteen comprehends the writing; beneath which are rude outlines of S'iva, and of seven other divinities, six male and one female, supporting him on either side.

Devapála, the ruler mentioned in this monument, does not seem to be identifiable with any mediæval prince of the same name, hitherto discovered. Nor has it been ascertained whether he belonged to the royal house of Málava which included the last Bhoja and his son Udayáditya in its lineage. From the manner in which he is spoken of it might, however, be inferred that his descent was not a source of particular pride; or it would have been detailed with the usual degree of amplification.

As the substance of this inscription is meagre, so is its language. And it is not only meagre. A number of deviations from the
No. XCVI.—NEW SERIES, VOL. XXVIII.

standard purity of the classical idiom will not fail to be perceived by the learned reader.*

ओम् । नमः शिवाय ।

सर्वकर्मसमारम्भे गीर्वाणैर्यो नमस्कृतः ।

स मया पार्वतीपुत्रो हेरम्बः प्रार्थते चिरम् ॥ १ ॥

भारती भवतां भूयाद् वागुल्लासविकाशदा ।

जगज्जाद्यं तमोऽधस्तात् कुर्वन्ती भा रवेरिव ॥ २ ॥

केशाः कञ्जालिकाशाभाङ्गङ्गारा ह्ये पिनाकिनः ।

विधिगा गतयो दद्युः शं वो जाम्बुनगौकसः ॥ ३ ॥

संवत् पञ्चसप्तत्यधिकद्वादशशताब्दे १२७५ मार्गसुदि ५ शनैः
स्वस्तिश्रीमद्भारायां समस्तप्रशस्तोपेतसमधिगतपञ्चमहाशब्दालङ्कार-
रविराजमानपरमभट्टारकमहाराजाधिराजपरमेश्वरपरममाहेश्वर-
श्रीलिखायाप्रसादवरलब्धप्रतापश्रीमद्देवपालदेवचरणानां महीप्रवर्ध-
मानकल्याणविजयराज्ये सति ।

अधिके पञ्चसप्तत्या द्वादशशब्दशते शके ।

वत्सरे चित्रभानौ तु मार्गशीर्षे शिते दले ॥ ४ ॥

पञ्चम्यन्तकसंयोगे नक्षत्रे विष्णुदैवते ।

योगे हर्षणसञ्ज्ञे तु तिथ्यर्धे धाट्दैवते ॥ ५ ॥

श्रीमदुन्दपुरे पूर्वमासीद् घोसीति पूरुषः ।

ख्यातः सर्वगुणैर्लोके विलोके सम्मतः सताम् ॥ ६ ॥

तदौरसः शुद्धमतिर्बभूव

श्रीबिह्वणोऽनङ्गसमानमूर्तिः ।

तस्याऽऽत्मजोऽभूद् वणिजां महात्मा

* A few faults of the engraver are here noted as specimens. The first stanza has प्रार्थति चिराम्; in the third it may be that he ought to have written विवधा; and the seventh immetrically exhibits ढल्ल. In the twelfth stanza the original has सुमहाद् यमः. This must be corrected as in my text, or else to सुमहायशः

श्रीऽल्लनामा महनीयकीर्तिः ॥ ७ ॥
 तस्याऽनुजः केशवनामधेयो
 वणिकपथे शुद्धमतिर्जने रतिः ।
 आसीत् तदा धर्मनिकेतनः सदा
 भूदेवभक्तः स्वजनेऽतिरक्तः ॥ ८ ॥
 तेनाऽकारि मनो धर्मे केशवेन सुजन्मना ।
 नलिनीदलनीरेण पश्यता सदृशं वपुः ॥ ९ ॥
 हर्षपूर्वात् पुराद् देशविभागे लोकनन्दनम् ।
 चकाराऽऽयतनं शम्भोरम्भोनिधिसमं सरः ॥ १० ॥
 तत्सन्निधाने हनुमत्त्वेत्रपालगणेश्वरान् ।
 स्थापयामास दृष्ट्यादीन् नकुलीशमथाऽम्बिकाम् ॥ ११ ॥
 लोकानुरागतस्यागात् विप्रसन्तर्पणात् सदा ।
 देवार्चनाग्निहोमाभ्यामर्जितं सुमहद् यशः ॥ १२ ॥
 लोके ब्रूते केशवः सत्यवाक्यं
 मत्प्रासादं यो नरः पश्यतीमम् ।
 तद्दीर्घं मा भूतले सुप्रसिद्धं
 जानन्वेते सञ्चनाः सर्वदैव ॥ १३ ॥
 महाजनानुरागेण श्रेयो मम वितन्वता ।
 कृता शस्ता प्रशस्तीयं धीमता देवशर्मणा ॥ १४ ॥
 शुभं भवतु लेखकपाठकयोः सर्वदैव । शिवमस्तु ।

TRANSLATION.

Om! Adoration to S'iva!

1. Persistently do I supplicate Heramba,* the son of Párvatí;† him who is reverently saluted, by the gods, at the outset of all undertakings.

* A name of Gaṇeś'a, the mythological patron of letters, and, more particularly, the remover of obstacles.

† The daughter of Himálaya, and wife of S'iva.

2. May Bhárati,* who dispels the darkness of the world's stolidity, as the light of the sun *dissipates the gloom of night*, confer upon you celebrity for increase in *the power* of discourse.

3. May the *matted* locks of Pinákin,† resembling, *in colour*, black bees on the water-lily, and adorning the quarters; and *his* menacing utterances; and the regulated evolutions of him whose abode is on the *jambu-bearing* mountain;‡ bestow upon you prosperity.

In the year twelve hundred and seventy-five, *or*, in numerals, 1275; on Saturday, the fifth *day* of the moon's increase in *Márga*:§ when, in the happily|| thriving *city* of Dhárá, was held the government—whose fortunes and successes were greatly increasing throughout the earth—of the feet of the fortunate Devapála Deva; endowed with all excellencies; resplendent with the decoration of the five great titles *which he had* obtained;¶ supreme sovereign, great king,

* Or Saraswatí; the goddess of learning. A victim to the incestuous passion of her father, Brahmá, she is fabled to have been childless.

† That is, S'iva; from *pináka*, his bow, or trident.

‡ This is an epithet of Pinákin, with which word it might, in translating, have been placed in opposition.

Mandara, or else Merumandara, is the mountain on which stands, according to the Purānas, a gigantic *jambu-tree*, the Eugenia Jamboo.

There is an allusion here to the boisterous dance of S'iva, the *tánḍava*.

§ Or *Márgáś'irsha*, as below.

|| The position and use, in this place, of *swasti*, 'happily,' are peculiar. Another interpretation is, however, admissible.

¶ The Sanskrit of the words from 'endowed' to 'obtained' is identical with a clause which Colebrooke renders with an expression of distrust as to his understanding the whole of it. See his Miscellaneous Essays, Vol. II., p. 303, note.

It may be erroneous to take *samastapras'astopeta* as an independent expression. Again, but for the order of the original words, it might be considered that 'the five great titles' are enumerated in 'supreme sovereign,' &c. Only four of these denominations are, however, specified, on some occasions where the five titles are spoken of in proximate connexion with them. See, for instance, Colebrooke *ubi supra*.

Mr. Walter Elliot says: "Lord of the *pancha mahás'abda*, or 'five great sounds,' is a title always joined with that of *mahá-maṇḍales'wara*, and never with that of the sovereign, in any of the more modern inscriptions. It does, however, occur among the titles of Pulakes'in, in the copper inscription of Capt. Jervis." *Journal of the Royal Asiatic Society*, Vol. IV. p. 33, note. All that can safely be

chief ruler, lord paramount, emperor; to whom majesty was derived from the boon of the favour of the auspicious Liswáyá:* or, expressed metrically;

4. In the *S'aka* year twelve hundred and seventy-five, called Chitrabhánu,† in the light fortnight of *Márgas'irsha*,

5. Its fifth day and Saturday‡ concurring, under the asterism whose superintending divinity is Vishṇu,§ during the *yoga*|| termed *Harshana*, and the *karana*¶ over which Dhátri holds the presidency;* the matter under record was transacted.

said touching the phrase in discussion is, that its import is not yet determined, nor the grounds which were reputed as authorizing a ruler to affect its appropriation.

* Perhaps the king's mother; possibly, the local name of some goddess. But the Sanskrit is hardly decipherable with any certainty.

† As the present inscription came from the south of the Nerbudda, it is deserving of remark that its style of date is at variance with the alleged local variations in reckoning the cycle of Bṛihaspati. See the Asiatic Researches, vol. III. p. 217; 8vo. edition.

‡ In the original, *Antaka*, or *Yama*; the name of the regent of Saturday. For convenience of reference, the regents of the days of the week are subjoined:

Sunday.	S'iva.
Monday.	Durgá.
Tuesday.	Guhá.
Wednesday.	Vishṇu.
Thursday.	Brahmá.
Friday.	Indra.
Saturday.	Yama.

§ This constellation is the twenty-third, or *Sravaṇa*.

|| For the meaning of this technicality, and for a list of the *yogas*, see Colebrooke's Miscellaneous Essays, vol. II. pp. 362 and 363. Also see Col. Warren's *Kála-sankalita*, p. 74.

¶ Called, in the Sanskrit, by its less usual name, *tithyardha*, or 'half a lunar day;' the length of its duration. See Colebrooke's Miscellaneous Essays, Vol. II. p. 364.

* Dhátri is Brahmá; and his *Karana* is Bálava. The *Karanas* and their tutelars are particularized below:

Variable <i>Karanas</i> .	Tutelars.
1. Bava.	Indra.
2. Bálava.	Brahmá.
3. Kaulava.	Mitra, the sun.
4. Taitila.	Aryaman, the sun.

6. In the auspicious *town of Undapura** there lived, in time past, a person by name Dhosin; renowned, in the world, for every virtue, and highly considered by the saints in heaven.†

7. His lawfully begotten son was the fortunate Bilhana; pure of purpose, and, in form, the peer of Ananga.‡ And his son was the fortunate Dhalla, so called; high-souled among merchants, and of repute challenging respect.

8. His younger brother, who bore the appellation of Kes'ava, was a *man* of guileless mind in affairs of traffic, kind to the people, an abode of merit, ever devoted to the gods of the earth,§ and warmly attached to his own relatives.

4. Regarding *his perishable* body as like a *drop of* water on the leaf of the lotus, the well-starred|| Kes'ava applied his heart to pious observances.

10. In the neighbourhood¶ of Harshapura he constructed a superb* temple to S'ambhu, and a reservoir like the sea.

5. Gara.	Bhú, the earth.
6. Vanija.	Ramá.
7. Vishti or Bhadrá.	Yama.

Invariable *Karānas*.

1. S'akuni.	Kali.
2. Chatushpada.	Ukshan.
3. Nága.	Nága.
4. Kinstughna.	Maruta.

* This is not to be mistaken for what is now vulgarly called Indore; a corruption, it is said, of Indrávara.

† *Viloka*, 'the other world;' heaven, or hell, according to circumstances. In the acceptation of *paraloka*, this word has no place in our dictionaries.

‡ 'The bodiless;' an appellation of the Hindu Eros, whom S'iva reduced to ashes.

§ A magnificent epithet of Bráhmans.

|| To translate *su-janman*, conformably to its etymology, by 'well-born,' would convey a wrong impression in our idiom.

¶ So I render *des'a-ribhāge*, at a venture. 'In a section of the place' would be a strict translation. The fifth case after this term may be accounted for by the particle *vi* which it embodies. But the Sanskrit is impure.

* Closely, 'pleasing to the people.'

11. Near him* he caused *idols* to be set up of Hanumat, Kshetra-pála, Gaṇeś'wara, Kṛishṇa, &c., Nakulís'a, and Ambiká.†

12. For *his* general benevolence, *his* bounty, *his* constant entertainments to Bráhmans, *his* adoration of the gods, and *his* offerings to fire, he acquired the highest renown.

13. The *following* words of good faith Kes'ava addresses to the community : 'as for human kind who look upon this my temple, well known over the face of the earth, may these worthy people at no time whatever think ill of it.'

14. This elegant eulogy *was* composed by the learned Deva S'arman, had in esteem by the great,‡ and the augments of my good fame.

* The writer's meaning is, 'near the image of S'ambhu, sheltered by this temple.'

† Kshetrapála, or 'the guardian of the soil,' is, at least now-a-days, a personage of uncertain or various identification. At Benares he is one with Bindu-mádhava, among the Vaishṇavas; and, with the S'aivas, the same as Bhairava. The latter view has the support of the *Baṭuka-bhairava-stotra*. In many places, as I know from personal observation, the name of this agrestic protector is bestowed on figures of Hanumat.

The unnamed divinity, coupled with Kṛishṇa, is Garuḍa. His place is at the right hand of the principal image of a group, as that of Hanumat is at the left hand.

Gaṇeś'wara is Gaṇeś'a, elongated for the sake of the metre.

Of Nakulís'a, as here intended, I can affirm nothing positive. But it is not necessary to presume a mistake, in this place, for *nakules'a* or 'lord Nakula,' one of the forms of S'iva: since this god, as S'ambhu, is already embraced in the sacred company under description. In Nágojí Bhaṭṭa's scholia on the *Chaṇḍí-páṭha*, ad finem, is a passage, purporting to be taken from the *Váráhi-tantra*, in which the Destroyer is called Nakulís'a, as being the consort of Nakulí, a Tántrika name of Durgá. Nakulís'a—written, perhaps, Nakules'a also—is, again, an inferior manifestation of S'iva. Further, in what is stated to be an extract from the *Vámana-purána*, Nakulís'a is given as the title of one of S'iva's bands of attendants; that which is stationed at the west of him. Once more, Nakulí—as distinctly appears from the *Nakulí-vágíswarí-paddhati*—being Saraswatí, Nakulís'a is one with Brahmá. The worship of this divinity has, however, long been disused. I have never seen but a single temple to him, that at Pohkar, near Ajmere.

Ambiká is Párvatí. See the first couplet, and a note on it.

‡ This phrase may also import 'well-affected towards the great.' As the

May happiness ever attend the scribe and the reader of *this composition*. Be there auspiciousness!

Fort-Saugor, September 2nd, 1857.

inscription has so much to say of traders, it is just possible that *Mahájana* may intend this class of persons, and not 'great' or 'respectable.' The word, it should seem, sometimes bears this sense in Sanskrit; but, perhaps, by insensible or ignorant adoption of the signification attached to it in the spoken languages. See Colebrooke's Digest of Hindu Law, &c., Vol. II. p. 303, foot note; 8vo. edition.

The continuous notation, observed on the stone, of the metrical portion of this record has been followed in the transcript now edited.

These fourteen stanzas are all in the *Vaktra* measure, three of those which succeed the prose being excepted. That numbered as the seventh is *S'ubhá* or *Buddhi*. I shall recur, on a future occasion, to the class of mixed metres to which this appertains. The metre of the eighth stanza is likewise composite, a species of *upajáti*, but of which I can discover no specific appellation. Its first and fourth quarters are *Indravajrá*; its second, *Vans'astha*; and the third, *Indra-vans'á*. The thirteenth stanza is *Sáliní*.

I avail myself of this opportunity to rectify an error into which I have fallen regarding the acceptation of the phrase *pádánudhyáta*. See p. 226 of vol. xxvii. of this Journal, foot-note. My opinion there expressed, besides having the weighty support of Colebrooke, was based upon an examination of all the instances, accessible to me when I wrote, of the employment of this locution. But it appears, from two examples occurring in the same inscription, that it sometimes indicates merely a kindred successor, or, perhaps, only a successor. Where, of two brothers, elder and younger, the latter accedes to the throne in sequence to the former, the words *pádánudhyáta* are, in the cases alluded to, used to denote their relation as consecutive princes. See the Journal of the Bomhay Branch of the Royal Asiatic Society, for January, 1851, pp. 219 and 220.

A Sketch of Toungoo History.—By Rev. Dr. F. MASON.

To the Editor of the Journal of the Asiatic Society of Bengal.

SIR,—Perhaps none have read Capt. Yule's paper on the ancient Buddhist remains at Pagán with more interest than myself, especially his invaluable historical note. I am full in the belief that when we become better acquainted with the Talaing and Burmese historic literature, we shall have a history of the country nearly as accurate as Macaulay's, if not quite so poetic. Native histories are difficult to be obtained, when obtained difficult to read, and when read, difficult to translate, so as to interest European readers. When I came up to Toungoo in 1853, I read two different histories of the country in Burmese, but have never before offered a sketch of their contents to the press, for the reason given above. Capt. Yule's article, however, exhibits so clearly the lack of historical documents on this country, that every contribution, however small, to supply the deficiency, cannot but be acceptable. It is to be regretted that so few thoroughly versed in the languages have leisure to do any thing in this department, we are indebted to Col. Burney and Major Phayre for nearly all we know of Burmese history.

Capt. Yule is surprised to find all the details of the architecture at Pagán of Hindu origin; but there is little reason for astonishment when it is known that Anoratha, or Anoratha Sau men,* when he established Buddhism in Pagán, built all the Pagodas and temples in Pagán after the exact models of those then existing in Thatung or Satung, of the same size, and in the same order. Such is the testimony of Talaing tradition, and I believe of Talaing history. There is proof on the pages of your Journal,† that he sent to Thatung for Rahans and priests versed in the Pitakat to teach his people, and that he obtained the descendants‡ of Sona and Uttara, the first Buddhist missionaries from Central India to Burmah. As Thatung was then the principal city in the country for religion, it probably held a similar distinction in the arts, and as Solomon sent

* အနောရထဝေါမင်

† May, 1834. "Inscription from Ramree Island."

‡ Erroneously rendered in the Journal. "Through the instrumentality of Sonathera and Uttarather, and their disciples and survivors."

for his builders to Tyre, so Anoratha procured his from Thatung; while there is room for little doubt that Thatung was originally a Hindu colony, and it is quite certain that it was in frequent communication with Ceylon. Capt. Yule says: "Suvannabumme," he adds, but unfortunately stating no authority, "is still the classic Pali name of Satung." No better authority will be required than that furnished by your Journal. The inscription from Ramree Island* was made subsequent to A. D. 1786, and in that Suvannabumi stands as the classic name of Thatung. "In the sacred era 236," as we read, "religion was established by the venerable Sona and the venerable Uttara in Suvannabume, the Thatung country."†

There is great confusion and often contradiction of dates in all the native histories through the carelessness of copyists. We cannot be certain of an approximation to accuracy without comparing different copies, and different histories.

Yours very sincerely,

Toungoo, December 15th, 1857.

F. MASON.

HISTORY OF TOUNGOO.

The history opens with a brief epitomy of Gaudama's life, and states that he came to the country of Toungoo, here denominated Zeyavatana.‡ When he reached the place where old Toungoo was subsequently built, he said to his favourite disciple Unanda: "Here thou and I were brother white cocks in a former state, each with five hundred followers, and fed in this place. Hereafter my relics will be enshrined here and worshipped." Crossing the river, on the east side, on the site of the present famous Pagodas of Myatso-nyie-noung,§ he said to Ananda: "Thou and I were

* See note † above.

† Rendered in the Journal: "In the country of Suvanna bumi (in Burmah called Sathum)."

‡ ဇေယျာဝတီ

§ မြတ်စေတီတော်

born white cocks in this place, and here we came at night to roost. Hereafter my relics will be enshrined here and worshipped."

After stating that the Pagodas were not built in the days of Dwattaboung, the founder of Prome, A. C. 443, the history passes to Dammasoka. "In the sacred era 223 [A. C. 320], Dammasoka, the universal monarch, residing at Palibrotha, having obtained the relics, called up the rulers of eighty-four thousand countries and provinces, and gave to each eight portions of the relics, commanding them to return and enshrine them in their respective countries, building over them Pagodas, and digging wells and tanks in their vicinity. The Toungoo chiefs took their relics and built four Pagodas over them in the places previously mentioned by Gandana."

From Asoka the history passes abruptly to Narapadiesethn king of Pagán, whose classic name is here given Tanupadiepa* country. He descended the Irrawaddy A. D. 1191, and guided by astrological prognostications, came up the Sitang to the Toungoo Pagodas, which being in ruins he repaired them, and on leaving, appointed one of his ministers, Nandathurieya† governor of the country, who made Kampamyen‡, on the Sitang in the north part of the province, the seat of his government. He was succeeded at his death by Men Hlazo § of whom nothing is said, but that his son Thawonlenkya|| ruled after him. Thawonlenkya, changed his capital and settled on the north side of Htswa creek, twenty or thirty miles north of the present Toungoo. Here he founded a city which he called Kya-khat-wara,¶ where people gathered to him in great

* တမ္ပဒိပ

† နန္ဒီသုရိယ

‡ ကမ်ပါမြင်

§ မင်ထုစေါ

|| သဝံလကျင်

¶ ကြခတ်ဝရ

numbers from every direction. Warieyu,* king of Martaban, came up, destroyed the city, and carried away the ruler and his family to the town of Thu, between Shwegyen and Sitang. This event is placed A. D. 1256. According to Talaing history, this king there called Wareyo, did not come to the throne till A. D. 1281. The same king appears, though not by name, in the 'Inscription on the great bell brought from Aracan,† according to which he did not ascend the throne of Pegu till A. D. 1370; but the same event in the history of Martaban is placed in 1289. If the bell inscription be asumed as the most correct, then Toungoo history must be out a whole century or more.

While in captivity, Thawonlenkya had two sons born unto him, the great Thawon‡ and the little Thawon; and when about to die, he charged his sons, saying, "This is not our country but Ramey, go to Zeyawatana. If you wish to be good men, go up the river Athawatie Pong-loung,§ and follow up Khaboung creek till you reach a small mountain spur [Toungoo]."|| In accordance with their father's instructions, after his death, they came up the river Sitang and established themselves at the place indicated, A. D. 1278.

Another character is now introduced. A teacher at the town of the Htieling, said to one of his pupils, Karen-ba, "If you go south you will become a good man." He went south, and after remaining some time at Kentha, finally removed, and took up his abode in the south-east of Kaylen, naming the place the Karen city. Tradition says that this man was a Karen, his name which signifies "Karen-father," and his founding a city, called "Karen city," confirms the

* ဝါရိယု In Talaing history ဝရေရော

† Journal of A. S. of Bengal, April 1833. The translator places the event in 1622 by omitting a figure in the date, and changing the era. The text says in the sacred era 1913 [သာသနာတော်ဘိဇာဒ္ဒတွင်] but the translator drops the first figure, and then renders it as the vulgar era.

‡ သဝန်

§ အါသာဝတီပေါင်းလောင် i. e. the Sitang.

|| တောင်ဂူ

tradition, yet many Burmese say he was a Burman, and his name Karen-ba, an epithet and not his proper name.

When the brothers heard of Karen-ba's proceedings, they communicated with him, and entered into an agreement to found a city together. After traversing the whole region in search of a suitable locality, they ultimately determined on the site of old Toungoo some twenty-five miles north-west of the present city, where they founded "Great Toungoo," A. D. 1281. It is said they built mat houses on each of the four sides of the city to the four great guardian spirits, or Nats, making offerings to each; which proves they were not pure Buddhists.

The elder brother was killed by the younger and died A. D. 1317. The younger brother survived seven years dying A. D. 1324; and his widow and son being discovered in a conspiracy to assassinate Karen-ba, they were both put to death. Karen-ba died a natural death A. D. 1342; but the next two kings, who succeeded him were murdered after short reigns; when Thimpauka came to the throne, in whose days the kingdom flourished. He exchanged ambassadors with the Talaings, the Burmans and the Yunes;* and conquered the five provinces of Yelway.† Associated with the Talaings, he made war on the king of Prome, Tsau yan nung,‡ took him and put him to death A. D. 1370. Passing over two other kings, we meet with Men Boung,§ who sent presents to the king of Ava Tswatsokay|| to maintain peace, and also to Byanya-oo,¶ king of Pegu. This king, according to Talaing history, died A. D. 1388, which synchronises with this history. This Men Boung patronised the cultivation of the lands, it is said, as well as the making of offer-

* “ယွဲန် Cochin China,” says Judson, but I take them to be Shans.

† ရေလွဲ

‡ စေါရန်နောင်

§ မင်ဘောင်

|| စွာစေါက်

¶ ဗျညာဠိ

ings. While absent at Myabla, a town in the northern portion of the province,—where our present Deputy Commissiouer, Capt. D'Oyly, is founding a Shan colony—the Shans entered Toungoo and assumed the reins of government, but he returned suddenly in a single night, attacked the Shans, and defeated them with great slaughter. He died A. D. 1392. Passing on, we find A. D. 1428 the king of Toungoo allied with Byanya-yan* king of Pegu in a war against Prome. The Pegu king, who, according to Talaing history, reigned between A. D. 1418 and 1450, besides land forces, brought fifty war-boats against the city; and the king of Toungoo brought two hundred elephants, one thousand horsemen, and twenty-nine thousand infantry. They took the city and carried off much plunder.

A daughter of the king of Toungoo having married the son of Narapadi king of Ava, Toungoo became a dependency of Ava. Narapadi died, it is said A. D. 1468, and the Ava Chronicles, as translated by Col. Burney, represent him as reigning in 1449.

After twenty-nine kings had reigned Zeyathura† came to the throne, an independent sovereign, A. D. 1485. He removed his capital, first to the mouth of Kaboung creek where he built Dwayawadie,‡ and next to the site of the present city of Toungoo, which he built and named Ketumatie§ [i. e. Possessed of the royal banner] A. D. 1502 says one history, A. D. 1510 says another. This name was retained in official documents, but Toungoo, the name of the first city transferred to it in common use, though being situated in a plain, far from the mountains, it is inappropriate. One hundred and seven thousand, five hundred and twenty-four persons were said to have been employed in building the city. Zeyathura had several bráhmans at his court, and they exercised considerable influence

* ဗျာဏာရန်

† ဇေယျာသူရ

‡ န္ဒါရာဝတီ The same name appears to have been given to Saudoway.

See Journal May, 1854.

§ ကေတုမတီ This name appears to have been previously given to Pagan.

Journal April, 1838.

over the religion of the people. On my arrival, in 1853, I found a ruined building in the north-west corner of the city, which contained decayed wooden images of Vishnu, and some other Hindu gods, to which the inhabitants were in the habit, formerly, of making offerings; and in the account of the ceremonies at the completion of the city, it is said that Ganesa was placed on a stone slab on the south side of the city. In the centre was an image of Gaudama with the Pitakata before him. The people were assembled without the walls and a procession formed, with the king at the head, who entered the city at the principal gate on the east side. When he reached the outer gate of the palace, the bráhmans and the chief architect exclaimed: "Let the ruler of this land and water, the excellent king of the law, possessing great glory, ascend into the golden palace which he has built; that he may observe the ten laws of kings, that he may give, during the whole of his life prosperity to religion and to the inhabitants of the country." At the foot of the palace steps, he did homage to "Brahma, Indra, Devas and to the three objects of Buddhist worship, exclaiming: "I worship the Buddha, I worship the law, I worship the priesthood."

Soon after the completion of the city, the king was involved in a war with Ava, then ruled by Narapati, the "Shwe-nau-kyany-shang, proper name Narapati" of Crawford's table, there said to have ascended the throne A. D. 1501, which synchronises with Toungoo history, and goes far to confirm the statements of both. A. D. 1503, Zeyathura went out to meet the king of Ava with twelve hundred fighting elephants, six thousand horsemen, and fifty thousand foot, who was defeated and entered into a treaty. Another war was followed by another treaty, and the king of Ava finally gave his daughter in marriage to the king of Toungoo; who died A. D. 1531.

Mentara his son ascended the throne, and conquered Pegu to which city he removed the seat of his government; and gave Toungoo to "the Shañ Menyay-thie-ha-thu,"* who, at his death, appointed his younger son Thie-ha-thu, his successor. After a short period his elder brother Htsen-phu-shen took the reins of government, but when he obtained the throne of Pegu he restored Toungoo

* ရှိမင်ရဲသီပာသူ

to his brother, who ruled under the name of Menkhaung.* This was A. D. 1551, and Talaing history has a Hsen-phu-shen king of Pegu, who died A. D. 1562.

Menkhaung was succeeded by his son Menyay-kyau-ten,† who built a large palace in the middle of the city, the ruins of which still remain. He was succeeded by his elder brother, Natshen-maha-damma-yaza.‡ In the year 1601, the son of Nyounyan-maha-damma-yaza,§ king of Ava, came against Toungoo, and took it. In Crawford's table, Nyoun-yan, there "Naung-ram," ascended the throne of Ava A. D. 1597, quite in agreement with this history. He left Natshen in charge of the city, but took his mother and his two brothers Menyay-kyau-ten,|| and Menyay-kyau-tswa,¶ and placed them in the city of Penya.* In the year 1611, intelligence was sent up from Toungoo to Ava that the Portuguese and Aracanese were about to come against the city. The king gave orders for succours to be sent to Toungoo in charge of Menyay-kyau-ten, but before he arrived, Toungoo had been taken, and Natshen with all his court carried captive to Syriam, A. D. 1612. In the same year the king of Ava took Syriam, and "having done in it as he wished," returned with many captives.

The next and last date in the book is A. D. 1637, where it is stated, that all the officers of government received their appointments from Ava, to which place all the taxes collected were to be carried. With the complete subjugation of the country to Ava, the history closes.

* မင်ခေါင်

† မင်ရဲကျော်တင်

‡ နတ်ရှင်မဟာဓမ္မရာဇာ

§ ညောင်ရမ်းမဟာဓမ္မရာဇာ

|| မင်ရဲကျော်တင်

¶ မင်ရဲကျော်စွါ

* ပင်းယ

Reply to Mr. Pratt's letter to the Asiatic Journal on the Indian Arc of Meridian.—By Captain F. P. TENNANT, Bengal Engineers, F. R. A. S. 1st Assistant G. T. Survey of India.

A couple of days ago, I received the copy of the letter from Mr. Pratt to the Secretary of the Asiatic Journal. As I am not a member of the Society I should be much obliged by your communicating the following answer.

1. I must explain; that the direction of the plumbline at any point of the earth's apparent surface is determined by combined action, of the centrifugal force resulting from the earth's revolution round its axis, and the attraction of every particle of the matter constituting the earth. These are the only forces in action; and the result would be; were all the matter in the earth free to arrange itself; that the figure would be rigorously an ellipsoid of revolution, whose ellipticity would depend on the law of the earth's density in approaching the centre.

2. The earth however is not fluid. The position of every particle of by far the greatest portion of matter is almost unchangeable. In addition to this, there are many projections from the general surface, and depressions below it, as well as internal irregularities of structure. All these are small with reference to the enormous mass of the earth itself which may therefore be most simply considered as an ellipsoid of revolution + superfluities of matter in certain positions — certain deficiencies. So also the total attraction of the earth is the resultant of the attractions of the ellipsoid and the separate irregularities.

3. Were the ellipsoid alone existent, the plumbline would be every where normal to its surface, that being one of the conditions of equilibrium, but in consequence of these irregularities the direction of the plumbline is changed and there is hardly any point of the earth's apparent surface where it is perpendicular to the surface of the fundamental ellipsoid.

4. In geodesical operations we project all our stations, and consequently the arcs joining them on a surface which is always perpendicular to the plumbline; that surface being selected which

is defined by the mean sea level; and it is on this consequently that our arcs are measured. As this differs from the fundamental ellipsoid, only in consequence of the attractions of the irregularities, it follows, that, could we remove *all* the consequences of the attractions of *all* the irregularities, we should have the lengths and amplitudes of our arcs as though they were measured on the fundamental undisturbed ellipsoid. *Every difference is caused by some irregularity*; and this is certain, though we may be unable to assign its origin. That we shall ever be able to account for all these differences I do not expect. Omniscience alone could assign the places and masses of all the portions of the earth—but, that irregularities sufficient to account entirely for every deviation from the fundamental form exist appears a result of the laws of matter absolutely unquestionable.

5. The case of the form of the earth is thus assimilated to that of the orbit of a planet. Did the solar centre of our system alone exist with one planet, this last body would describe a rigorous ellipse about the sun; but, in consequence of the existence of other planets, this mean ellipse nowhere satisfies observation, but we can always find an ellipse which will correspond to three observations but will soon exhibit sensible deviations from observation. It is universally recognized that this is a legitimate consequence of the law of gravitation. No one for many years has ventured to doubt that the apparent irregularity of a planet's motion is caused by the attraction of other planets. Theory has fully accounted for all the deviations; and lately, when the observed positions of the planet Uranus were found undoubtedly to differ from the computed places after all known corrections were applied, Astronomers did not assert that the orbit was nearly but not quite an ellipse, that the law of change could not be assigned, &c.; on the contrary, the development of the irregularity brought about a general tendency to seek its cause, and finally, Messrs. Adams and Leverrier predicted within narrow limits, the place and mass of the disturbing planet which we now call Neptune. Had they followed the course Mr. Pratt seems to take, they would have upheld the irregularity of the orbit; and, what is now a triumph for the universal law of gravitation, would have been a reproach to science.

6. The uncorrected data of any two arcs close together will give

an ellipse strictly analogous to that in common use in physical astronomy and known as the orbit due to *the varied elements*; whereas the mean or fundamental ellipse derived from a number of distant observations will nearly, though not quite, satisfy all and bear the same relation to the previous one that the mean orbit does to the varied orbit.

7. Here the analogy ceases. The Heavenly bodies in connection with the sun are few and definite; we can thus assign the law of variation of the elements of the orbits. On the earth we cannot, and in the heavens as on the earth the varied elements without this law, are useless. The mean elements in the heavens would give places not very far removed from observation for a limited time, on the earth they would do so always, the difference arising from the motion inter se of the celestial disturbing masses and their fixity on the earth.

8. I have now I think sufficiently explained my reason for considering (from theory) the true form of the earth to be an absolute ellipsoid. I now proceed to consider Mr. Pratt's 3rd and 4th paras.—Arguing from the known changes in the form of the apparent surface which is visible to our eyes, Mr. Pratt reasons that there are changes in the curvature of the unperturbed surface, by which I mean, that which is the result of removing entirely the effects of all irregularities. Nothing could I think possibly be more fallacious than the argument. The change of outward form of the earth is caused by the transference of matter, and it is known principally by relative changes in the height of adjacent parts. In consequence of these changes, are also changes in the perturbed form of the earth, but when we eliminate all the effects of disturbing matter we evidently must, both before and after the changes, attain the identically same fundamental form.

9. Indeed we only know of these so-called actual changes except in very exceptional cases* (which moreover are of small extent) by reference to the sea level whose changes (being those of the disturbed surface) are small in comparison, if the fundamental form be fixed. If that, however, be liable to variation we have lost our reference, and we cease to have evidence of the changes of height.

* Such as the volcanic peak Jorulco and Coral Isles, and landslips.

10. From what I have said it immediately follows that the coincidence of the deduced form of an arc with the fundamental one is evidence of the absence of local disturbance or compensation for its effects, while deviation from the fundamental form shows in itself that the local disturbance has been either wrongly estimated or entirely neglected. If this be not so, we have to add to a sufficient and actually existent though numerically unassignable cause for the difference, one whose existence is uncertain, if not, as I believe, impossible.

11. Mr. Pratt appears to rest his opinion that I have misunderstood the subject, on the fact that I have not gone through his voluminous computations and produced a new result. I have not been guilty of this presumption. Our knowledge of the forms of the disturbing masses is very imperfect, and their internal constitution is almost unknown, so that I cannot flatter myself that I should attain a result in which I had more confidence than in Mr. Pratt's; and the research required would be very great. I have therefore preferred showing that the result at which he arrives has no claim to be considered a satisfactory representation of the form of India either practically or theoretically; and, if I have succeeded (as I believe I have) my answer must be considered conclusive as to the existence of some flaw in Mr. Pratt's data or processes without my actually pointing out where it occurs. As, however, my avoidance of the subject has been misunderstood, I may say that there is some reason to believe that the masses of the Himalahs have been considerably overstated in Mr. Pratt's paper, while no notice has been taken of the mountains of Central and Southern India.

12. In Article 7, Mr. Pratt remarks on the indefiniteness of my estimate of the attraction at Banog. With my opinions I could evidently have no such confidence in the best attainable estimate as would have justified the time and labour requisite for its production. The most cursory consideration of Mr. Pratt's estimated attractions at the stations mentioned in his paper with a knowledge of the position of Banog will show that I am justified in calling it enormous on Mr. Pratt's hypothesis. That such was the view I took, and that I did not extend Mr. Pratt's law as he appears to imagine, is evident since by it, the attraction would, in longitude, much exceed the 20' at which I took it.

13. The next point requiring notice is the note to page 11, where I submit Mr. Pratt is in error. The surface on which the arc is projected is that which is modified by local attraction or C_n of his figure and not C_B which represents that attained after eliminating the local attraction's effects. The stiling process is actually carried on and the reductions to the lengths of the arcs are necessary.

14. From the figure of the earth, the astronomer seeks to determine the radius or the length of the line joining his place to the earth's centre and the angle which this line (or its projection on the plane of the meridian) makes with the perpendicular to the surface. Mr. Pratt's figure being confessedly only very local cannot give these data.

15. The Geodesist again seeks to determine from one station whose latitude is known and also the azimuth and distance of a second, the latitude of the second, their difference of longitude and the azimuth of the first at the second. Mr. Pratt's figure cannot give these, as I have shown in the case of the longitude and reverse azimuth at Karachee.

16. In my second paper noticed by Mr. Pratt I say, "I have shown in my former paper that the ellipse given by Mr. Pratt for the Indian meridian is useless for Geodesical purposes. I have now, I think, shown reason to believe that there is no evidence which will warrant our considering that any real departure from the mean form exists," and again "the only figure of any Geodesical or astronomical importance is, that determined as usual from the consideration of a number of arcs situated in various circumstances as regards sources of probable local disturbance, I think I have supported this.

17. Were we possessed of a large number of observations of latitude and longitude extending over India or the whole world, the true step to take, after the astronomical precedent, would be to determine (which of course is theoretically possible) the size and position of the deflecting masses requisite to recougle the observed places with those geodesically determined. Whether the requisite observations will ever be available, or the Analytical Giant who must use them, is almost beyond even speculation. Meanwhile, let

us put full faith in the law of gravity as not to be shaken by dubious analogies.

18. I trust I shall not be supposed to depreciate Mr. Pratt's analytical conclusion. All knowledge is gain and Mr. Pratt's law of dissection is an acquisition which will doubtless find its practical application in due time. At present we can only look on the results of the paper as an arithmetical illustration of the formula and as not to be employed in the question of the earth's figure.



Mr. Pratt's Second Letter on the Indian Arc.

To the Secretary of the Asiatic Society.

SIR,—In reply to Mr. Tenuant's letter brought before the Society at its last monthly meeting, it appears to me quite sufficient to ask your readers to read again my letter in your Journal No. III. 1858.

The question appears to myself to be a very simple one, and I wonder at Mr. Tenuant's not seeing it in the same light.* I can readily comprehend his being disappointed that the effect of the Himmalayas should be so troublesome; in this I can fully sympathise with him. But I have too great a respect for the Law of Universal Gravitation to leave out of consideration such a disturbing cause. These Himmalayas are as great a tyrant in the delicate problem of determining the curvature of the arc of meridian in Hindostan, as the planet Jupiter is in the Solar System. But as

* I have not noticed his analogy drawn from planetary orbits, simply to avoid being drawn into a discussion on Physical Astronomy. But I may say thus much, that this supposed analogy does not help matters at all. In the Survey in order to map the country, they use the Fundamental Ellipse. This analogy would therefore require that the Fundamental Ellipse should be used to find the place of a planet. But it is the "*Instantaneous* or *Varying Ellipse*" which is used for this purpose. It is the corresponding *Local* or *Varying Ellipse*, therefore, in going from place to place, that ought strictly to be used in mapping the country, and not the Fundamental or mean Ellipse. As far as there is any approach to analogy, Messrs. Adams and Le Verrier pursued precisely the same course which I have followed.

sure as I feel that Messrs. Adams and Le Verrier (to whom Mr. Tennant refers) never dreamt of ignoring the existence and attraction of that troublesome Planet, so clear does it appear to me that the Himmalayan attraction must not be trifled with and passed over.

2. It was to calculate this that my paper of 1855 was written. Other disturbing causes may exist, and should be estimated. But this cannot do away with the importance of estimating the effect of the Himmalayas. I have spared no pains to discover an antagonistic cause which would nullify the influence of the Himmalayas, but without effect. During the present year, I have forwarded to the Royal Society two other papers; one, estimating the effect of the deficiency of matter in the Ocean, which extends down from Hindostan to the South Pole; the other, the effect of any slight deficiency or excess in the density of mass of the earth prevailing over large spaces—such variations in density from the density of a fluid mass, under the same circumstances, as are not at all unlikely to have taken place in the crust of the earth in its becoming solid, or by expansions and contractions since that change occurred. The first of these disturbing causes we know exists, because the Ocean exists and is less than half as dense as rock. The amount of the effect is, however, uncertain because the depth of the Ocean is unknown. The result of the paper, therefore, shows the tendency and the nature of the effect, but not the exact amount.* The other calculation, viz. that of the effect of slight but wide-spread departures from the law of density in the interior mass, required by the fluid theory, was suggested by the hypothesis of Mr. Airy, that there might be a deficiency of matter below the Himmalayas which would, in a large degree, counteract their effect on stations on the Indian arc from Kaliana southwards. The result of this calculation is unfortunate; for it shows that such departures from the fluid-density as I have alluded to, and which may not improbably exist, will have a sensible and important effect on the plumb-line; *but* we have no possible means of becoming certain whether these variations of

* The attraction of the mountains and the deficiency of attraction of the Ocean are shown also to have a marked effect upon the sea-level, raising the level at Karachee many feet above the level at Cape Comorin.

density do exist or not. The uncertainty of the existence or not of this invisible enemy, and the utter impossibility (with our present knowledge) of ascertaining whether it does exist or not, and therefore whether our plumb-line is affected or not by some such invisible cause, is very troublesome—very far more so than the Himmalayas; because in their case there is a definite mass which it is possible to measure, and the attraction of which can be calculated. There is this to be said, that, as far as my investigatious help me to make a comparison, the effect of the Himmalayas seems to be much more important, while it is more manageable, than any other of the probable causes of derangement. But, whether or not, the Himmalayas are a certainly-existing and a definite mass, and their effect ought to be calculated. The calculation is not so “voluminous” or tedious as Mr. Tennant seems to suppose—not near so toilsome as some of those in which his duties occupy him.* Were it not for the peculiar law of dissection made use of, no doubt it would have been an herculean work which any one might well shrink from. But this law reduces it simply to determining from the Survey Maps the average height of the neighbourhood of about ninety different places; multiplying them by the cosine of the azimuth, reducing the result to miles, and multiplying it by $1''.139$, which gives the deflection. In the parts beyond the range of the Survey Maps, and which have not so great an effect on the stations of the arc in question, an average form is obtained from Humboldt's observations and from other sources, and the calculation requires only the summation of a few simple arithmetical series. All the heights used are noted down in the Six Tables pages 78—83 of the paper of 1855; and upon a correction being given me of any one of the heights, I can (and any one who will examine the method can) in five minutes find how much the resulting deflection of the plumb-line must be altered—such is the simplicity which this law of dissection introduces.

* He observes that the effect of the mountains in Central and Southern India have not been considered. If Mr. Tennant will draw the lunes and compactments on a map as described in my paper and note down the heights and depressions of the several parts he will see that the effect will be too trifling to be taken notice of. This examination would not occupy him half an hour.

3. These calculations have been gone through again lately by a practised computer, working them under my direction by another course. The result is, that while the first calculation (of 1855) makes the deflections in the meridian at Kaliaua, Kaliaupur and Damargida to be $27''.853$, $11''.968$ and $6''.909$; this revised calculation makes them $27''.943$, $12''.047$ and $6''.790$. The differences are too trifling to be of any moment; and what variation there is rather aggravates the effect. All the separate errors in the first calculation, the aggregate of which has made this small discrepancy, have been detected, so as to make the two calculations exactly to tally. If there be, therefore, anything wrong in these results, it must arise solely from the heights being wrongly taken, or the density being wrongly assumed. The density used is that of the comparatively small rock Schellien, and must be rather under the mark than over it; as that rock is but a few hundreds of feet high, whereas the most important part of the Himalaya mass is two miles high, and the lower parts must be denser, rather than lighter, from the pressure of the superincumbent weight. As to the heights, my own persuasion is, that, if anything, the most important heights are taken too small rather than too great.* But they are all written down in the six tables for inspection and criticism: and nothing can be easier than to point out which are too small and which too large. Any information of this kind forwarded to me I will immediately make use of, to correct the results—a work which will cost no labour and take but little time.

4. The calculations in the latter part of the paper of 1855 (after para. 47, p. 87) are more laborious: and here some numerical errors have crept in, one of which Mr. Tennant has pointed out, for which I thanked him in my former letter to you. These errors have no effect, however, upon the results of the paper. This part has, moreover, received a revise in my communications sent home last September. The result regarding the effect on the curvature of the Indian Arc will be modified—increased or diminished—accord-

*The Himalayas rise to more than five miles. But the greatest height I have taken in any one place falls a trifle short of two miles. The heights of *beds of rivers* above the level have been taken wherever they could be found, and not of the overhanging ridges and peaks.

ing to the existence, or not, and the character of, other co-operating disturbing causes.

5. The great importance of this subject in the problem of the Figure of the Earth—not the *average* figure of the *whole* earth, which has been sufficiently well determined, but of the separate parts—will be seen from the following facts:—

I.—Colonel Everest, in his large and valuable volume of 1847, assuming, as Mr. Tennant would do, that the Indian Arc is curved like the *average* ellipse of the earth; and ignoring, as Mr. Tennant would do, the effect of the Himalayas, brought out this result (see p. clxxviii of his Introduction), that by his geodetic computation Kuliana was farther north from Kalianpur by 1-10th of a mile than by the astronomical latitudes. He attributes this important discrepancy to mountain-attraction: but does not prove that mountain-attraction will produce this exact amount of error. My calculation shows that the effect of mountain-attraction is, not only to produce this amount, but a much greater amount, even three times as great: and the only way of making things tally is to assume that the form of the Indian meridian is *not* that of the *average* ellipse.

II.—If any one will turn to pp. lxx, lxxi of Colonel Everest's volume he will see the great care with which the amplitudes* of the arcs between Kaliana and Kalianpur, and Kalianpur and Damargida, were observed. For example; for the first, 36 separate stars were observed and the average results taken. Of these separate observations 29 differed from the mean by less than 1" in excess or defect, 6 by less than 2" and one was 2" $\frac{1}{3}$; so near were the individuals to the mean value; and yet, to get an accurate result, 36 observations were thought necessary—showing that even a deviation of 1" was considered of importance. But Himalayan attraction produces in this same amplitude (or difference of latitudes) an error of more than 15", and surely cannot be passed by.

III.—It is a fact palpable to the most ordinary observation, that the surface of the earth is not that of a perfect spheroid (or ellipsoid

* The *amplitude* of an arc of meridian is the difference between the latitudes of the two extremities of the arc.

of revolution,) and therefore its parts, at any rate near the surface, do not exert the same amount of attraction as if it were a spheroid. For example; mountains rise up on the North of India, and the Ocean spreads to the South. These, no doubt, we may *conceive* to be removed—the mountains to be pared down to the sea-level, and the density of the sea to be increased to that of rock. Were this done, the plumb-line might hang all right, in the true vertical or normal belonging to the surface of a spheroid. But since we cannot *actually* cut down the mountains, nor fill up the ocean, the plumb-line *will not* hang right for this purpose. If, therefore, we wish in imagination to remove the mountains and to fill up the ocean, we must do it by calculating their amount of influence, and allowing for this amount in our calculations. *Then* we may use the plumb-line, with this correction, as the true vertical or normal to an elliptic surface, but not before.

6. My object in writing these papers has not been to detect and expose flaws in the operations of the Great Trigonometrical Survey—very far from it; but to assist in pointing out the sources of error, and the further observations and surveys which are necessary to remedy the evils which must inevitably follow if these sources of error are not attended to. The elaborate and well-executed survey must be utterly useless in determining with accuracy the curvature of the Indian Continent, and therefore of mapping the country with high scientific nicety, unless this is done. Except to suggest a remedy in so important a work, after my attention had been called to it in 1852 by the present Surveyor General, I could never have devoted the time which has been necessarily occupied on this highly interesting subject, even with the relief which the assistance of a practised computer has afforded. The difference in the views which Mr. Tennant and I take of the subject must arise from some misconception which I am unable to fathom.

J. H. PRATT.

Calcutta, November 9th, 1858.

P. S.—Since the above was written, Colonel R. Strachey has favoured me with some information regarding heights in Tibet. I have given the results of these new data in a third paper to the Royal Society. They do not at all meet the difficulty.

Fragments of three early Hindu dramatists, Bhāsa, Rāmīla, and Somīla.—By FITZ-EDWARD HALL, M. A.

Elsewhere I have stated my belief that these are the poets who are named, with implied eulogy, near the opening of the *Mālavikāgnimitra*.* Bhāsa should seem to be also called by the longer name of Bhāsaka; and it may be doubtful, owing to the variations of manuscripts, whether Somīla be orthographical, or Saumīla. That the author of the *Mālavikāgnimitra*, to whom these poets were of course antecedent, is the Kālidāsa of Vikramāditya is, perhaps, questionable. Yet, whoever he is, he belongs to a respectable antiquity: and such are his own merits that his encomium would scarcely be expected of any competitors but such as once enjoyed considerable repute. In the ensuing verses we have all the remains of these three play-writers that appear to have reached the present time. For these few lines we are indebted to the *S'ūrngadhara-paddhati*, of which work I have collated several excellent and somewhat venerable copies. I commence with the relics of Bhāsa, whose era may be carried back, with positiveness, to the seventh century, at the least.† Supplials, in the translations, are indicated by italics.

अस्या ललाटे रचिता सखीभिर्
विभायते चन्दनपत्रलेखा

* Preface to the *Vāsavadattā*, pp. 14 and 15, foot-note: also pp. 20 and 21, foot-note.

† See the preface to the *Vāsavadattā* as by the last note. Bāna, in the *Harsha-charita*, speaks of Bhāsa. He is also extolled by Rājasékharā. But Rājasékharā's age is still to be precisely determined. It is certain that he was not very ancient. The *Jagaj-jīva-vrajyā* of Jayadeva, cited in the sixth chapter of the *Padya-venī*, a poetical anthology by Venidatta, son of Jagajjīvana, whimsically characterises Bhāsa, with Chora, Mayūra, Kālidāsa, Harsha, and Bāna:

यस्याश्चरश्चिकुरनिकरः कर्णपूरो मयूरो
भासो हासः कविकुलगुरुः कालिदासो विलासः ।
चूर्षा चूर्षो हृदयवसतिः पञ्चबाणसु बाणः
केषां नैषा कथय कविता कामिनी कौतुकाय ॥

आपाण्डुरक्षामकपोलभित्ता-
वनङ्गबाणव्रणपट्टिकेव ॥ *

‘Beauteous show the decorative lines of sandal traced on her brow by her attendants; and so the marks,—as it were plasters over wounds from Cupid’s shafts,—on the tract of her pale thin cheeks.’

दयितावाङ्गपाशस्य कुतोऽयमपरो विधिः ।
जीवयत्यर्पितः कण्ठे मारयत्यपवर्जितः ॥ †

‘How different, in operation, from other nooses, is the noose of a sweetheart’s arms! Fastened about the neck, it imparts life; loosened, it produces death.’

कपाले मार्जारी पय इति करान् लेढि शशिनस्
तरुच्छिद्रप्रोतान् बिसमिति करो सङ्कलयति ।
रतान्ते तल्पस्थान् हरति वनिताऽप्यंशुकमिति
प्रभामत्तश्चन्द्रो जगदिदमहो विङ्कलयति ॥ ‡

‘The cat laps the moonbeams in the bowl of water, thinking them to be milk. The elephant imagines that the moonbeams piercing through the intervals in the foliage of the trees, are esculent stalks of the water-lily. The mistress, again, after dallying, grasps at the moonbeams lying on the bed, taking them for her garments. Oh! the moon, intoxicated with radiance, bewilders the whole world.’

तौह्यं रविस्वपति नोच इवाऽचिराद् यः §
शृङ्गं रुरुस्यजति मित्रमिवाऽद्यतज्ञः ।
तेयं प्रसीदति मुनेरिव कर्मचिन्ता
कामी दरिद्र इव शोषमुपैति पङ्कः ॥ ॥

* This Stanza is in an *upajāti* measure consisting of alternate *Indravajrás* and *Upendravajrás*. Such a metre is denominated *Smṛiti*.

† *Vaktra*.

‡ *S’ikharinī*.

§ Query अचिराय?—EDS.

॥ *Vasantatilaká*.

‘The sun, like the vile, keenly annoys for a brief season. The deer casts his horns, as the ungrateful man *forsakes* a friend. Water becomes serene, as does the thought of active duties to the holy sage. The moist soil dries up, as does the wretched lover.’

Rámila and Somila, wherever they have been found mentioned, are mentioned in conjunction; the Beaumont and Fletcher, perhaps, of the classical Indian theatre. Only a single stanza of theirs is accessible to me.

सव्याधेः क्षणता क्षतस्य रुधिरं दृष्ट्य लालास्रुतिः
 किञ्चिन् नैतदिहाऽस्ति तत् कथमसौ पान्यलपखी नृतः ।
 आज्ञातं मधुलम्पटैर्मधुकरैरारब्धकोलाहले
 नूनं साहसिकेन चूतमुकुले दृष्टिः समारोपिता ॥*

‘In one who has been ill, there is emaciation; when one is wounded, *effusion of blood*; and, in the case of a person bitten by a *venomous animal*, flow of saliva. There is nothing, however, of these in this instance. How, then, did the wandering *self-styled* ascetic die? Indeed, it is surmised that the rash man cast his eyes on the opening buds of the mango-tree, newly resonant with bees transported with aroma: *and so he perished.*’

The spring-time is here suggested. The general purport of the stanza is, that the memory of the poor devotee, a mere neophyte, was carried back, by the humming of the bees, to other and more genial circumstances; that the reminiscence was too much for his acute sensibility; and that the shock deprived him of existence. Kálidása himself would not have been disgraced by this conceit.

* *S'árdúlavikrídita.*

On the Swayamvara of the Ancient Hindús, and its traces in the ancient world generally.—By E. B. COWELL, M. A.

One of the favourite incidents in the heroic poems of the Hindús is the rite called *Swayamvara* or the choice of a husband by a princess from an assembly of suitors met from all parts to take their chance in the lottery. Success is not represented as depending on their own efforts, as in many of our fairy tales, where the knight wins the lady by his own prowess in a tournament; the heroes here submit themselves in silent rivalry to the princess's inspection as she walks along their line, and selects from the throng the favoured suitor by presenting him with a garland, or a cup of water, or some such token of regard. The readers of Hindú poetry will at once remember many instances of this peculiar institution, which must have been not uncommon in actual life as well as in the ideal world of the heroic times, since we find it apparently alluded to in the following passage in Arrian's *Indica*. "The Indians neither give nor receive gifts when they marry, but when their daughters are of a marriageable age, their fathers bring them out publicly, and set them as the prize for the winner in a wrestling or boxing or running match, or any such manly exercise." This hardly corresponds with the practice as we find it described in Hindú literature, since Arrian represents the lady as acting a merely passive part, whereas, if we may judge by the poems and by the very name *Swayamvara* (from "*Swayam*" "herself," and *vara*, "choosing,") she had a much more active share in the transaction.* Dean Milman

* The custom is not found among the various forms of marriage given in Manu's third book, but this may be explained by the fact that the *Swayamvara* relates only to the choice of the husband, the nuptial ceremony being performed afterwards according to the proper rites. We find an allusion in a later part of the *Institutes* which proves the prevalence of the custom, as it is said (ix. 90, 91), "three years let a damsel wait, though she be marriageable; but, after that term, let her choose for herself (*vindeta*,) a bridegroom of equal rank; if, not being given in marriage, she choose her bridegroom (*adhigachhed yadi swayam*,) neither she nor the youth chosen commits any offence." The Scholiast explains it of the so-called *Swayamvara*, "*adhikayunaráláthe samánajátiguṇam varam swayam vṛiníta*."

has, to a certain extent, familiarised the English reader with the custom by his spirited translation of the scene in *Nala*, where Damayantí, the princess of Vidarbha (Berár), chooses the prince of Nishadha from the assembly of mingled gods and men.

“ On the gods an instant gazed she—then upon the king of men ;
And of right king Bhima’s daughter named Nishadha’s king her lord.
Modestly the large-eyed maiden lifted up his garment’s hem,
Round his shoulders threw she lightly the bright zone of radiant flowers.”

The Swayamvara of the sister of king Bhoja forms one of the most beautiful episodes in the *Raghuvans’a*, of which we may ere long hope for an English translation from Professor Griffith, already so favourably known as the translator of the *Kumára Sambhava*, or “ the birth of the Wargod.” Similar scenes occur in almost every Hindú poem ; in fact a Swayamvara is nearly as much an established ingredient in Sanskrit epics, as a catalogue of ships or heroes is in those of the west. We need only mention here those in the *Naishadha* and the *Mahábhárata* ; in the latter, besides that of *Nala*, translated by Dean Milman, we have that of *Dranpadi*, translated by Professor Wilson. Nay, the rite was so popular with the poets that it is even made current in the life of the gods ; and the Swayamvara of *Lakshmi* forms the subject of the drama, which *Urvási* is acting before *Indra* with her sister nymphs, when she loses her presence of mind and lets a mortal’s name escape from her lips.

In the following pages, I have collected from classical writers some of the more remarkable instances of the prevalence of this custom in other parts of the ancient world as well as India ; we shall find traces of its presence in widely different climates, Greece, Gaul and ancient Persia ; and in the last case, it may lead to an important and, I believe, hitherto unnoticed corroboration, from a Greek author, of one of the fine old traditions in *Firdausi’s Sháhnámeh*.

The first instance is one which the classical student will easily recall in the 6th book of *Herodotus*, where he discusses the rise of the family of the *Alcmæonidæ*, and its great increase of wealth and power by the marriage of *Megacles* with the daughter of *Cleisthenes*, the tyrant of *Sicyon*. This marriage is described as a true Sway-

amvara ; Herodotus' account reads like an episode of some ancient poem, when he represents the various princes and nobles flocking as suitors to the court from the chief cities of the Grecian world. The historian tells the account in his very best manner, how the favoured suitor Hippocleides at last grew presumptuous with success and "danced away" his fortune by his thoughtless frolic, and gave birth to the current proverb, *ὅν φροντὶς Ἴπποκλείδῃ*, while the young Athenian carried off the bride, and their descendant in the third generation was Pericles.

Another instance occurs in Justin's narrative of the founding of the city of Marseilles. A colony of Phocæans, under the leadership of Simos and Protis, landed in Gaul near the mouth of the Rhone. On their repairing to the court of Nannus, the king of the tribe, in whose territory they wished to settle, they found him, as it chanced, engaged in the ceremony of his daughter's marriage, whom he was preparing to deliver, *more gentis*, to the bridegroom whom she might select at a banquet. All the invited guests came as suitors, and among the rest the Greek strangers were invited to attend. At a given moment the maiden is introduced into the assembly, and her father bids her hand water to the man of her choice ; when forthwith, unheeding the others, she turns to the Greeks, and holds out the cup to Protis. The fortunate adventurer thus became the king's son-in-law, and founded Marseilles, where his memory was probably honoured as a patron hero. Athenæus tells the same story, on the authority of a lost work of Aristotle ; and adds that there was still a family in Marseilles called Protiadæ from their founder.*

But the most interesting of all these parallels is one which Athenæus has given us in the same place as a quotation from the tenth book of the history of Alexander (*τῶν ἱστοριῶν τῶν περὶ Ἀλέξανδρον*) by Chares of Mytilene. In itself, the narrative wears a peculiarly striking character, all the more so from its entire disconnection with any context, as almost every other line of Chares has perished ; and the actors of the scene appear and vanish abruptly, without our

* Cf. Justin, xliii. 4 ; Athenæus xiii. § 36. Aristotle represents the founder's name as Euxenus, and Protis as his son by the marriage ; but this is only one of those ever-recurring uncertainties in the "dissolving views" of legendary, as distinguished from authentic, history.

being able, from *classic* sources, to identify their persons or times. We give it in the historian's words.

“ Zariadres was the younger brother of Hystaspes, and both were fair, and the people say of them that they were born of Venus and Adonis. Hystaspes ruled over Media and the region below it, and Zariadres over the country above the Caspian gates as far as the Tanais. Now Omartes, the king of the Marathi, a tribe beyond the Tanais, had a daughter named Odatis; and of her runs a legend that she once saw Zariadres in a dream and fell in love with him, and the same thing likewise happened with him towards her. For some time they continued thus, loving each other, from the image in the dream. Now Odatis was the fairest of all the women in Asia, and Zariadres too was fair; but on his asking her in marriage of her father, Omartes would not consent, as he had no male child, and he wished to marry her to some one of his own people. And not long after, Omartes summoned all the nobles of his kingdom and all his friends and relations, and made a marriage feast, but told no one who it was that should marry his daughter. At length when the feast was at its height, he called Odatis into the banquet-hall, and said to her in the hearing of all the guests, ‘ Oh my daughter Odatis, we are now making thy marriage feast; look round therefore on the guests and view them all, and take a golden cup and fill it, and give it to him whom thou chooseth as thy husband; for his wife shalt thou be.’ And she then, looking round upon all, walked sadly away, longing to see Zariadres; for she had previously sent a message to him, how that her marriage was about to be solemnised. Now he chanced at the time to be encamped by the Tanais, and immediately on hearing it, he left the army secretly and crossed with only his charioteer; and mounting his chariot by night, came riding through the city, having driven more than 800 stadia. As he drew near the festal place where they were holding the marriage, he left his attendant with the chariot hard by, and marched boldly in, having put on a Scythian dress. On his entering the hall, he beheld Odatis standing before the sideboard, and weeping bitterly as she slowly filled the cup; and standing close by her, he said in a low voice, ‘ O Odatis, I am come as thou badest, I thy Zariadres.’ And she, turning round, beheld the stranger, fair to the

eye and like to him whom she had seen in the dream, and overjoyed she gave to him the cup; and he, seizing her in his arms, bore her away to his chariot and fled. And the servants and handmaidens, who knew of their love, stood silent, and when her father charged them to speak, they said that they knew not whither she was gone. And this story of their love is known among all the barbarians who dwell in Asia, and greatly indeed do they prize it, and they sculpture it upon their temples and palaces, aye and even in their private houses; and many of the nobles call their daughters Odatis after her."

Firdausi's great national epic is a Mausoleum in which he has embalmed all his country's ancient heroes, and inscribed all the old names associated with her days of independence, before her glories succumbed to Islam at Cadesia. He tells us that he collected his materials from the legends which he found floating amongst the *Dihkâns* or landed proprietors* of Persia, more especially in the remoter provinces. He thus gathered together the fragments of "Border Minstrelsy," and incorporated them in his own great poem, which, far from being a mere tissue of his own inventions, like Ariosto's Orlando, was meant to be a faithful monument of all that was remembered of Persia's heroic times.

That his work contains so little that is available for historical researches, arises from various causes, but there is no need to increase their number by supposing wanton infidelity to his trust on the part of the poet. So few of the Greek writers on Oriental subjects are preserved, that we have hardly any means left us to test

* "Les Dihkâns formaient une classe de l'ancienne noblesse persane. Ils étaient selon la définition qu'en donne le *Modjmel-al-Tewarikh*, "des chefs, des propriétaires de terres et de villages," et formaient une aristocratie territoriale qui retint, même sous le gouvernement des arabes, son influence locale..... Leur condition sous le khalifat devait être à peu près la même que celle des familles saxonnes de l'Angleterre qui gardèrent leurs propriétés sous les Normands, et à qui leur influence héréditaire tient encore aujourd'hui lieu de titres de noblesse [*country families*]." M. Mohl's preface to his edition of the *Shâhnâmeh*, vol. i. p. viii. The position of the dihkâns is a most important link in the chain that connects the present reminiscences of Persia with her own earlier times. Their authority is quoted in every part of the *Shâhnâmeh*.

these legends; and the very form in which we have them has been doubtless subjected to continual changes, as they floated on the lips of successive generations, ere they were stamped by Firdausi (A. D. 1000) into their present permanent shape. As it is, they bear all the marks of a legendary age,—deficient in everything but spirit and imagination,—and it is hopeless to construct a system from their chaos. Still such a system might have been partly possible, had Ctesias and Chares been preserved to us,—many a legend which now lies buried under its surrounding inventions, would have started into a new significance, if we could have compared it with some Greek account, which had preserved the true lineaments of the story.

The legend of Odatis, which has been casually saved by Athenæus' quotation from Chares, is a single specimen,—we have nothing else of the kind; but this legend is at once to be recognised in the *Sháhnámeh*; and the striking confirmation thus presented makes us realise how much we have lost in the wreck of Greek Oriental history.

Lohrásp, the king of Persia, had irritated his son Gushtásp by his excessive partiality for his children by another wife. Gushtásp in despair first fled towards India, but is followed by his uterine brother Zarír (Zariadres,) who persuades him to return to his father's court. He is, however, again provoked to fly, and he now bends his course to Rúm. On arriving at the capital, he in vain seeks for employment in the court, and, failing this, in the bazar; and he is well nigh reduced to desperation, when a Dihkán, in a neighbouring village, takes pity on his forlorn condition, and lodges him as a guest in his house. Of the remainder of the story we add a literal version, line for line with the original as given in Macan's edition, vol. ii. pp. 1038—1040.

The Kaiser of Rúm cast about in his mind,
 That, since his daughter was now of age,
 Her star of fortune high, and she ripe for marriage,
 It was time that she were given to a husband.
 He would gather an assembly in his palace
 Of all his wise nobles and counsellors,

There should meet together all his peers,
And his men of renown, lofty of stature.
In her father's palace that moon-faced maiden
Was to wander through that assembly, seeking a husband,
And her maidens were to stand round her in a ring,
That no man might see her lofty crown.
Now at that time behind the Kaisar's pardah,
Were three daughters like roses in spring,
Fair in stature and countenance and gentle manners,
Fair too in judgment, modesty and virtue.
The eldest of them all was Kitáyún by name,
And wise was she, bright-hearted and happy.
And one night Kitáyún had seen a dream,—
She had seen a landscape bright with sunshine,
And a band of chieftains had appeared in her sight
In a bright cluster like the Pleiades ;
And amidst them all was a stranger,
A gallant exile desolate-hearted,
His stature a cypress, his face like the moon,
And he sat as a king sits on his throne.
And Kitáyún, in her dream, gave him a garland,
And she took from him another, full of colours and scents, in
return.

In the morning when the sun came forth,
The nobles all awoke from their slumbers,
And the Kaisar called a great assembly together,
None of great or puissant but was there ;
Glad they hastened to the assembly,
And they called the peri-faced princess in.
With her sixty handmaidens came Kitáyún,
A bunch of fresh narcissuses in her hand,
And she walked along until sadness came over her,
For not in that assembly was the man of her choice.
And she turned from the hall and went back to her chamber,
Walking slowly and weeping and with a longing heart.
Then the earth became black like a raven's wing,
Till the sun again lifted his head from the mountaius.

Then the Kaisar commanded that from the men of low degree
 To the men of highest wealth and birth in Rúm,
 All should come with one mind to the palace,
 If among them might be found one whom the princess approved.
 When the news spread through the city,
 To the nobles and high and low,
 All turned their faces to the palace of the king,
 Each, in his hope, full of colours and perfume.
 And the good Dihkáu said to Gushtásp,
 "How long sittest thou hidden in thy cell?
 "Come, for if thou seest the palace and its pomp,
 "Perchance thy heart may lose its burden of grief."
 When Gushtásp heard this, he rose and went with him,
 And he hastened to the palace of the king;
 And he crept to a corner, away from the great men,
 And sat him down, full of grief and with a wounded soul.
 The attendants came forth with watchful hearts,
 Kitáyún and her rose-cheeked handmaidens,
 And she slowly walked round her father's hall,
 Her wise men behind her and her maidens before.
 When from afar she beheld Gushtásp,
 She exclaimed, "My dream has lifted its head from darkness!"
 And she decked the head of the gallant youth
 That same moment with her royal crown.
 When the wise vizier beheld her deed,
 At once he ran before the Kaisar,
 "She hath chosen a man from out the crowd,
 "In height like a tall cypress in the garden,
 "With a cheek like a rosegarden, and broad shoulders,—
 "All who look on him are lost in wonder.
 "Thou would'st say, 'he was the strength of the Almighty!'
 "But I know him not, who he is."
 Him answered the king, "God forbid that my daughter
 "Should bring shame from behind the curtain on her race.
 "If I give my daughter to a fellow like this.
 "My head will lie down in dishonour.
 "Go take her, and him too whom she hath chosen,

“And their heads shall be smitten off in the palace.”
The vizier replied, “This is no such direful matter ;
“Many a noble hath done thus before thee.
“Thou badest thy daughter choose a husband,
“Thou said'st not that she was to choose none but a king.
“She sought for one who might please her heart ;
“Turn not then thy face from the path of God.
“Such hath been the custom of thy ancestors,
“Those proud and righteous pure ones ;
“By this law hath Rúm been established on its base ;
“Wander not thou in a desert land.*
“Thy words are unblessed, utter them not,
“And stray not in a path untrodden by thee before.”
When the Kaisar heard his words, he made his resolve
To give his peerless daughter to Gushtásp,
But he said to her, “Go with him such as thou art,
“Never shalt thou have treasure or crown or signet from me.”
When Gushtásp beheld this, he marvelled greatly,
And he called to witness the Maker of the world.
Then he turned and spake to the royal maiden,
“Oh thou brought up in softness and delicacy,
With a rank so lofty and a crown thine own,
Why hath thine heart chosen such as me ?
Thou hast chosen an outcast, and with him no treasure
Shalt thou find, but thou must pine with him in sorrow.
Oh seek thine equal among these nobles,
That thy face may yet be bright before thy father.”
Kitáyún made answer, “Oh jealous one,
“Vex not thyself with the decrees of heaven ;
“Since I am content with thee as my husband,
“Why seek'st thou crown, or sceptre or throne ?”
Then sadly walked out of the Kaisar's hall
Kitáyún and Gushtásp with many a sigh,
And they came to the house of the Dihkán,
And sat them down shrinking and sad.

* Literally “in the land of the owl.”

We need hardly stay to dwell at length on the many points of coincidence between the legend of Chares and this of Firdausi. Gushtásp, Zarír, the dream, the Swayamvara and its denouement are at once prominent in both, and point unmistakeably to a common source. The very differences are not without a meaning; the Persian recension has naturally linked the tale to its national hero, Gushtásp, in preference to the less famed brother, Zarír; and instead of the Tanais and the Marathi, we have the more familiar Rúm of Firdansi's own time. But the peculiar features of the ancient story remain unchanged amidst the fluctuations of time and place; it is still the old legend which was "known among all the dwellers of Asia" and "sculptured on their temples and palaces." Chares of Mytilene hands it to the grammarian of Alexandria, who preserves it through the dark ages in the west; while in its own land it lives in the memories of the people, (*volitat vivu' per ora virúm.*) through all the changes of Arsacidæ, Sasanidæ and Mohammedans, until Firdansi arises under Mahmúd of Ghazni, and stereotypes it from the lips of the Dihkáns of his day.

Report on Geological Specimens from the Persian Gulf collected by Lieut. C. G. Constable, I. N.—By H. J. CARTER, Esq., Bombay.

This Report has, so far as the Persian Gulf is concerned, been drawn up partly on Geographical, and entirely on Geological, data specimens and sketches furnished by Lieut. C. G. Constable, I. N., who, assisted by Lieut. A. W. Stiffe, also of the I. N., has been, and still is, employed in surveying parts of the Gulf; and in whose accuracy I have reason from actual experience, to place every confidence.

Geography.—Sailing northwards from Muscat, we observe that the great chain of mountains behind the town known by the name of Jibel Akdtbur, or the “Green Mountains,” is continued on to Ras Mussundum, which forms the western promontory of the Persian Gulf, where they suddenly sink to an altitude of 400 feet, while not more than thirty miles further back there is a point 6,700 feet high. The Straits themselves are also about thirty miles broad, and on the opposite side the land slopes into the sea with a more or less even shore and without promontory for a considerable distance north and south, forming a strong contrast with the intensely fretted out and rocky termination of the chain on the Arabiau side. Striking, however, as the contrast is at these two points, there are two mountains within sight of Ras Mussundum on the opposite coast, which are respectively 8,500 and 5 to 6,000 feet above the level of the sea; the first, which is Jibel SHEMEEL, is about 70 miles northward, and the other, called Jibel Bees, about 60 miles eastward. These, then must be regarded as the two pillars of the Straits on the eastern or Asiatic side.

Again, from the Straits westwards, if we trace the shores of the Gulf, it will be observed, that while the north-eastern side is bordered by the mountainous chain of which Jibel SHEMEEL forms a part and which continued on north-westwards up into Khouristan, borders the Mesopotamian valley under the name of the Khourd Mountain, the south-western or Arabian side is, with the exception of a low hill here and there, only a few feet above the level of the sea, from the western promontory of the Straits

up to the town of Konett at the top of the Gulf, and even far beyond this into the plains of Mesopotamia.

Lastly, turning our attention to the Persian Gulf itself, we find that although the bottom is, as a matter of course, more or less uneven, yet that it shallows generally, from the great fault marked by the chain of mountains on the north-eastern side on towards the Arabian coast. Hence the deep water, which nowhere exceeds 50 fathoms, is all on the Persian side, while a greater part of that on the south-western half of the Gulf, especially where the great Pearl Banks are situated, is not more than 10 fathoms deep.

The principal Islands, too, are all on the Persian side and towards the mouth of the Gulf, while those which are in the south-western half are, with the exception of Bahrein, almost all insignificant, either from their little size or low altitude.

Geology.—On entering the Gulf, Lieut. Constable's specimens from Ras Mussundum show that this promontory and the mountains about it, are chiefly composed of a more or less fine, compact, lead-blue passing into black, limestone, which in some parts is fossiliferous, as the remains of a large *Pecten* attached to some of the specimens proves.

Passing further in we come to the islands of Larrack and Hormuz, which are twelve miles apart, and the former about twenty-six miles north of Ras Mussundum. Larrack is 400, and Hormuz 700 feet high. From Larrack we have specular iron-ore as its characteristic; and from Hormuz, rocksalt, sulphur, gypsum, specular iron-ore, and pyrites. Hormuz is described as consisting of a plane of salt-rocks about 50 feet above the level of the sea, out of which rise several white peaks which attain the altitude mentioned. Around these the salt-rocks present a dreary waste of ridges and ravines covered with a soft red earth, which has been eliminated from their interstices by deliquescence of the salt during the moist and rainy weather. The white peaks, on the other hand, are composed of a greenish-white jasperous rock, like an ill-formed or decomposing diorite, charged with nodules of pyrites and intensely impregnated with salt; this rock looks like a pseudo-trap diorite, that is, a trap-diorite which has accidentally become mixed with stratified deposits during its fluidity.

Passing on to the island of Kishm, which is within ten miles of Hormuz, and the largest by far in the Persian Gulf, being about 55 miles long, but very narrow; the specimens and descriptions of this island show that it presents the same kinds of rocks as those of Hormuz and Larrack, but in addition to these there is a stratified sedimentary formation upon it of great extent, and upwards of 500 feet in thickness.

The latter is particularly well seen about the town of Kishm, which is situated at the eastern end of the island, in long inclines terminating in bluff precipices, some of which are 570 feet high. Again at Bassadore, which is situated at the opposite or western end of the island, it is equally well seen in the form of flat-topped precipitous elevations called the "Great" and "Little Hummucks," of which the former is 500 feet high.

This formation consists of upwards of 500 feet of calcareous clay, capped by from 30 to 40 feet of a more or less coarse, and more or less consolidated, detritus of shells and calcareous grit.

The clay is of a light grey colour, very fine consistence, effervesces violently with acids, and is veined throughout with fibrous gypsum. It is also very plastic, and is used extensively in Kishm for pottery. Some portions bear impressions of bivalves, but those which I have are too imperfect for description.

The detritus of shells, again, may be coarse or fine to almost chalky. The shells are semifossilized, easily separated from the mass in which they are imbedded, and bear such a resemblance to those of the present day that they appear to be the last raised from the bottom and sides of the Gulf. Whether this formation is conformable to the clay beneath, and whether the two belong to the same, or to two different geological epochs, further observation must determine.

Thirteen miles from Bassadore on the same island, are "the Salt Caverns" where a green trap-diorite is found, specular iron-ore, sulphur, &c. as at the islands of Larrack and Hormuz, and these volcanic products, as well as the sedimentary formation, we shall presently see, are also extended to the mainland or coast opposite.

After the island of Kishm, we come to the great and Little Tombs, Polior Nobflure and Surree; the furthest not more than 55, and the nearest only 15 miles from the western end of Kishm; and here

again in each, we have most of the characters of the foregoing islands, viz., green trap-diorite, specular iron-ore, gypsum, salt, sulphur, &c., as well as a white calcareous grit containing semi-fossilized shells, similar to that which caps the clay on the island of Kishm, but the clay appears to be absent. Here the calcareous deposit is identical with that which I have called "Milliolite," on the south-east coast of Arabia and with that "free-stone" from Khattiawar imported at Bombay under the name of "Porebunder Stone." That from Polior and the Great and Little Tombs contains a large cancellated *Lucina*, characteristic of the same formation at Morbat on the south-east coast of Arabia; also *Tridacna*, *Avicula margaritifera*, or the common Pearl-Oyster, *Fistulana*, a small *Echinus*, Corals, &c.

From the island of Aboo Moosa, a little to the south of the latter, the characteristic specimens are again the "Milliolite" resting on the veined clay; and there is a compact yellow limestone peak probably of Eocene age which rises to 370 feet above the level of the sea; but there are no volcanic products here.

Going back to the Persian side of the Gulf, we have again the "Milliolite" characterizing the islands of Kais, Hindi Arabi and Monakeyla, all situated very near the shore; but no longer any volcanic products in either.

Lastly, we arrive at the islands of Karrack and Khago, which are close together, and about 35 miles north-west of Bushire. Karrack presents the same kind of sedimentary formation as that of the island of Kishm; but here the clay is changed for a very fine laminated sandy deposit with little scales of mica, capped, however, as usual with the coarse shelly deposit.

The rock from Khago is a calcareous gravelly "Milliolite," composed chiefly of rounded pieces of shells firmly consolidated. The same kind of rock also forms the islets of Hargooz, Farsee, Arabi, and El Kran, which are situated near together more towards the Arabian side of the Gulf, about 80 miles south of Karrack.

Returning to the Persian side, on the mainland opposite Bassadore is a sulphur mine, which is much worked by the Arabs, and about 20 miles further on is the town of Linga, close to which are hills of fine diorite like that near Muscat; and a little to the west of these, we come again upon the sedimentary formation first seen at Kishm,

which is here raised up into a hill 330 feet high, and on the top of which is the fort of Kalah Leshtan. As at Kishm, 30 feet of the top consist of a coarse, shelly detritus, and the 300 feet below of clay thickly veined with fibrous gypsum. Still further on, at Jilla el-Abed, which is opposite the island of Khais, we have trap-diorite again and specular iron-ore with rock salt.

Beyond this, at Assaloo, we have the characteristic gypseous formations of the coast, viz. earthy and massive white, crypto-crystalline gypsum; and at Tahree again, we meet with the "Milliolite," sloping up from the shore a little distance from the sea, so as to form an inclined plane with a scarp behind, in which an innumerable quantity of troughs of different lengths have been cut at right angles to the inclination, and which, from the number of wells present, would appear at some remote period to have been used as a garden, perhaps for supplying the town, which now lies in extensive ruins a little distance off on the shore; there are also holes in the precipitous parts of this incline, where it has been cut through by ravines, which appear to have been used for sepulchral purposes; but Lieut. Constable, who has a full description of the whole, will one day, I trust, lay his interesting account of this locality before the public.

Lastly, at Bushire we have the same kind of fine sandy deposit capped by shell-detritus or shell-concrete as that of Karrack, indicating that the nearer we get to the Shat el Arab, from which the whole has probably been derived, the coarser the sediment becomes, while the further off we go, as at Kishm, the more subtle it is. At Bushire there also appears to be a still more modern shell-concrete.

Observations.—Hence we learn that there are two striking geological features at least in the Persian Gulf. One the presence of a sedimentary formation of more than 500 feet thickness, which has been raised above the level of the sea; and the other, the existence of a volcanic area, including all the islands at the eastern end of the Gulf and part of the mainland, which is characterized by the presence of trap-diorite and a great development of rock-salt, gypsum, sulphur, pyrites, specular iron-ore, &c.

The type of the sedimentary deposit we have found to be upwards of 500 feet of fine calcareous clay veined with fibrous gypsum, and

capped by 20 to 30 feet of a calcareous, shelly grit more or less coarse, more or less chalky in consistence, and in which the shells are semi-fossilized or semi-lapidified. Whether these two distinct deposits are conformable to each other or not I am ignorant, but the sketches of them which I possess are in favour of the former; at the same time, although conformable, they may contain fossils of different geological epochs, which would prevent their being grouped together. Unquestionably the calcareous shelly grit of Kishm is identical with the same formation, slightly modified, in the other parts of the Gulf, and which modification identifies it with the same deposit on the south-east coast of Arabia and that on the outer or western coast of Khattywar in India, which I have termed "Milliolite," and assigned provisionally to the Miocene era. Provisionally, therefore, it might be as well to consider that of the Persian Gulf together with the clay, also Miocene.

Another interesting point then presents itself, viz.—When were the volcanic islands of the Gulf raised above the sea? And this seems to be answered by the position of the Miocene formation at the island of Kishm, which, resting upon these rocks, and being capped with a material which must have been deposited at the bottom of the sea, proves that the elevation of these islands, or this volcanic out-burst, took place after the Miocene period, and was the last great convulsive displacement to which the earth, under and about the Persian Gulf, has been exposed; for there has not been any other subsequent sedimentary deposit of any consequence raised above, or probably deposited in, the sea of the Persian Gulf since that period.

Having arrived so far then, we may with profit, perhaps, trace this volcanic agency a little further, and first following the Mekran coast on to Kurrachee, we find an extensive area in the province of Luss, where this disturbance is still in great activity; not, however, pouring forth fire and lava, but sulphurous gas and water, which, bubbling through a clay deposit of great thickness, has thus formed mud-mountains and mud-craters over an area between the highland of the interior and the sea which occupies the greater part of this province. Moreover, the very same kind of sedimentary formation, equally broken up too as that on the island of Kishm, characterizes

this area towards the sea, and from thence, as I have stated in my "Summary of the Geology of India," is continued on into Lower Sind.

But what struck me forcibly in the portions of mud from these mud-volcanoes, which were sent to the Society by Mr. H. B. Frere, Commissioner in Sind, was the presence of calcareous matter mixed with sulphur and passing into gypsum or sulphate of lime,—connected with the great development of impure rock gypsum (that is gypsum veining an aluminous, earthy, consolidated base, which, from Lieut. Constable's specimen, appears to exist throughout the sub-range of mountains between the highland and the sea all along the north-easterly side of the Persian Gulf, indicating that this has been formed in a similar way, and that the process above described is going on now and has existed for ages.

Now carrying our speculation out a little further, and going to the upper end of the Gulf, we may reasonably infer that as the same range of mountains bordering the north-eastern Coast of the Persian Gulf is continued on into Persia, and up into Khourestan under the name of the Khourest Mountains, forming the north-eastern boundary of the vale of Mesopotamia, in which springs of asphalt abound,—the same source of subterranean disturbance, (probably a carboniferous deposit mixed with pyrites) exists throughout; and finds its different outlets all along the great crack or fault in the earth, which must accompany the precipitous or south-western face of this highland tract.

Furthermore, it is not improbable that the so called "marbles" of Nimroud and of all the great cities which have existed in this vale that have been brought to light, and which are chiefly composed of mottled impure rock-gypsum, precisely like that of the hills on the shores of the Persian Gulf, have been obtained from quarries in the sub-ranges of the Khourest Mountains. Lastly, might it not have been the outburst of volcanic matter which we now know to have been that which threw up the Miocene formation of the Persian Gulf, and the last upheaval, apparently, of any consequence in this sea, that caused the disturbance of level in the vale of Mesopotamia, which led to the overflowing of these cities with the mud under which they now lie buried and thus concealed from view.

Perhaps in no part of the world could the phenomena connected

with the formation of rock-salt, rock-gypsum, sulphur-pyrites, and specular iron-ore, be studied with such ease, certainty and success, as along the sub-ranges of mountains which extend from Mekran up into Khourdistan.

Of the formation composing the highland I can only infer, as the scarps are said to present a white aspect, that it is capped by the eocene limestone, which forms part of it when extended into Arabia on one side and into Beloochistan and Sind on the other.

Memorandum on Education in China drawn up from information afforded by the Ex-Imperial Commissioner Yeh.—By C. ALABASTER, Esquire.

Education in China is so much influenced by the direct as well as indirect patronage of the State as to be there rather a Government than, as in most other countries, a public institution; not only does Government in great measure support it by the establishment of free Schools at every official station in the Empire, but, by keeping the Public Examinations in its own hands and by making these the only means of gaining rank or position, it prescribes the nature and extent of the knowledge chiefly acquired for their attainment.

The theory on which it acts seems to be that of Confucius, the wisdom of which the long stability of the Chinese Empire has tested, that to make men good subjects you have only to make them wise, to do which, it is only necessary to give them education; and again, that though a strong Government, keeping the people down by severity, may prevent their rebelling, it is only a good one ruling them by persuasion, that can prevent their desiring and seeking to do so.

This theory, having been adopted, has been put in practice in China for centuries, the measures taken for its efficient working reflecting the highest credit on Chinese statesmen.

First.—All official employment has, until very lately, when this rule has been most unhappily deviated from, been the reward of knowledge, representing as it does in Chinese minds, wisdom, knowledge only to be acquired by following the course of study prescribed by Government.

Secondly.—The Emperor, by his example and by his periodical exhortations, sets and keeps up the fashion, and by making the interior not the exterior of a man the test by which his pretensions to position are determined, causes his subjects to devote more care to the former than to the latter.

And lastly, by keeping up a system by which all the burthens of the state fall on the rich ignoramuses, while all the prizes fall to the scholars, the spirit of economy, so strong in Chinese breasts, is enlisted in the pursuit of knowledge.

Thus, Education is so widely spread in China, that Yeh, when asked how they managed to do justice there, none of the Mandarins being able to speak the local dialects, was able to say, Why, very easily: all the depositions are written down and submitted to the parties interested, and there is not a single household in China which has not at least one member able to read.

The elementary schools are, however, all in private hands, and so early do the Chinese youth commence their studies, that the rudiments are always taught at home, one Chinese philosopher, indeed, saying that education should commence previous, not subsequent to, birth, and the sage Mercuris is cited as an instance of the favorable results of this course being followed.

Having then learnt his A B C at home, or more correctly, having had his eye familiarized with the written character by getting up a certain number of easy simple signs answering to our pothooks and hangers, and been instructed in a few ordinary rules of decorum and behaviour, the young student is, if his father is too much engaged to attend to his instruction himself, and too poor to hire a tutor to do it for him, sent off to a public day School, where a little book is put into his hand which he has to learn by rote, and having thus accomplished the first drudgery of his life, it is explained to him; the first sentence impressing on him that he is by nature good, and that if he becomes depraved, he is then in an abnormal and unnatural condition.

To give him time to digest this and other similar pieces of wisdom, a second book, more difficult than the former, is given him to be learnt by rote, before it is explained, and having mastered this, he is

advanced to a higher class and the glorious study of Confucius is opened to him.

By the time he has learnt the four books by heart, and has read some of the commentaries upon them, he has finished the curriculum of study taught at ordinary schools, and, unless his family think his talents are sufficient to promise success at the examinations, his course of study; returning to his family utterly deficient in all scientific knowledge, believing that the world is flat, and that three quarters of it are Chinese, ignorant of Mathematics and caring little how far it is to the moon, but fully impressed with the truths that honesty is the best policy, that if you would be respected, you must respect others, that it is your duty to honor your parents and lay down your life for your prince, that you should never do wrong under any circumstances whatever, that you will do more by reforming yourself than by seeking to improve others, and that it is advantageous to tell the truth to your friends.

Should, however, the student shew signs of talent, his family subscribe to hire a tutor for him to read with, or he offers himself as a candidate for admission at one of the Government Schools, where, if successful, he has the advantage of receiving the instruction of the best masters, gratis, until he is qualified to try for a degree.

In these Schools, the Masters of which receive salaries varying from 4 to 40 Pounds a month, the books written by the ancient sages, edited by Confucius, are read with the numerous commentaries upon them, and the living commentary history, is studied; here too they are first initiated into the mystery of paraphrasing the moral maxims of the ancients and of writing themes upon them.

They now go in for their first degree, being equally able to compete if they have studied at home instead of at these public Colleges, and if successful, their education is thenceforth the care of the State. Educational Officers being appointed to assist and direct them, keeping up the spirit of emulation in them by frequent trials and examinations.

Many, however, now give up their studies, seeking employment as teachers in the schools or as tutors in private families and sometimes sacrificing their pride to their covetousness, becoming clerks in Public Offices.

Such as persevere, and there are instances of men doing so sixty years, become gradually perfect in the art of writing essays, and take their next degree, which renders them eligible for office, and, unless they prefer giving up their ambition for a tutorship, enrolls them in the large band of expectants, as they are called, who, in the hopes of gaining a post at some future day, give their services gratis until that time.

There is a higher degree than this, which, if you wish it, gives you office the moment you obtain it, but the examination for it is so strict and so severe, that comparatively few pass it; for this, you are not only required to paraphrase or write essays on texts taken from the four books, or the five classics, and to be well read in the history of China, but, the Ex-Commissioner says, must be able to write essays on subjects like the following:—"The dews fall in Autumn" shewing the connection between this extract from the Book of Odes and the system of taxation, in short to shew how every act of Government is, or rather might be, based on the classics.

This, as the degree of Master in Masonry, is the highest generally taken, but there is one still higher conferred by the Emperor himself, assisted by the greatest scholars in the Empire, this constitutes the successful candidate, a Member of the Imperial College of the Hanlin, where he is employed writing state papers until the Emperor has need of his services as an administrative Mandarin, or despatches him on some special mission, the diplomatists of China being generally selected from this body.

Thus, from the commencement of their education to its termination, Moral Philosophy is their only study, having mastered that they are then, says Confucius, wise, and as the wise man, he adds, is not a kettle, meaning thereby that he is fit for all purposes, not for one only, he is qualified to act as Judge and put his fellowmen to death, although, like Yeh, he has never opened a law book, as a revenue Officer, although ignorant of Arithmetic, or as an Engineer, although he has never heard of Geometry.

The explanation Yeh gives of this is, that the Chinese Officials always keep clerks to look up the law of a case, while they elicit the facts, or to make any calculations that may become necessary, a

latitude always being allowed, justice rather than equity being looked for in their Courts, and a surplus, rather than a nicely adjusted balance, in their accounts.

They have no industrial, agricultural or Art-Schools, sons, generally following in the footsteps of their fathers, thus rendering these unnecessary, for though, says the Ex-Commissioner their establishment might lead to improvement, they are not required, things going on very well as they are, and no improvement being wanted.

The study of languages is also neglected, for, as Yeh says, all foreigners who go to China learn Chinese, and what is the use of our taking all the trouble of learning foreign languages, to no end, for he ignores or disbelieves the fact, that foreign literature could give him many new ideas; in short, all knowledge, save of the writings of the wise men of China, is considered useless and unprofitable.

But although the area is so circumscribed, it takes a long time travelling over, so slowly do they progress, and some are thirty or forty years at their books, before they can take even the first degree, it is possible, however, to take them all at an early age, an instance being mentioned of a boy of sixteen gaining a chair in the Imperial College, while Yeh was only nineteen when he took his first, and nine and twenty when he took his last degree,—knowledge being the sole qualification required.

The final examination, that for the degree of Hanlin, is held by the Emperor himself, assisted by the wisest members of the College, that for the next or Doctor, is also held at Peking, the expenses of the successful candidates from and back to their villages, being defrayed by Government even for the next, that equivalent to the English Master of Arts examination, it is thought necessary to send special Examiners down from Peking, who, while on their Mission, rank with the highest provincial authorities, the last degree alone being conferred by the Literary Chancellor, an Official equal in rank to the Lieutenant-Governor of a Province.

Such is a brief sketch of male education, which, widely spread as it is, exercises a powerful influence over the Chinese mind, but which, ignoring as it does religion, as Yeh confesses, merely checks open vice and utterly fails in its great object to make men good.

Female education is not so widely spread: the female members of a family having their cookery and embroidery to fill up the hours, which, in the absence of all amusement, the boy is compelled to devote to his books; but girls nearly always receive some instruction from their parents, and if of good family are expected to be able to read and make verses.

There are instances of Chinese ladies devoting themselves to literature, and some of their best histories are written by women, but as there is nothing tangible to be gained by female learning, the Chinese ladies rarely go beyond the four books, even if they go so far, and having accomplished this, they return to their kitchen, where, more fortunate than their husbands, they acquire at least one useful science.

Save in the Province of Kuangtung (Canton) there are no girl-schools in the Chinese Empire, and as the Ex-Commissioner's modesty prevented his investigating their internal arrangements, we have no certain knowledge on this point; it is also customary in some places for daily Governesses to be employed, but the Ex-Commissioner is also quite unable to give any information respecting them.

PROCEEDINGS
OF THE
ASIATIC SOCIETY OF BENGAL,

FOR DECEMBER, 1858.

The Monthly General Meeting of the Society was held on the 1st instant.

A. Grote, Esq., Vice-President, in the Chair.

The proceedings of the last meeting were read and confirmed.

Presentations were received.—

1.—From Dr. Theo. Cantor, vol. I. of the *Ichthyologiae Archipelagi Indici Prodromus* by Doctor Bleeker.

2.—From the Secretary Royal Society of Antiquaries at Copenhagen, several publications of that Society.

3.—From the Secretary Royal Society of London, several Nos. of the Society's Proceedings, Vols. 146 and 147 of the *Philosophical Transactions* of the Society, and several other publications.

4.—From the Secretary Geological Society of Dublin, through Mr. Oldham, several vols. of the *Journal* of that Society.

5.—From the Secretary Government of Bengal, copy of a report on the Survey operations of the Lower Provinces for 1856-57.

6.—From Baboo Onongomohun Deb Mitter, a copy of the *Mittra Bungsabulli*.

Maharaja Suttish Chunder Roy Bahadoor, proposed by A. Grote, Esq., and seconded by the President was named for ballot at the next meeting.

Mr. C. Alabaster proposed by A. Grote, Esq., and seconded by W. S. Atkinson, Esq., was also named for ballot at the next meeting.

The Council reported.

1.—Recommending that Dr. Max Müller proposed by A. Grote, Esq., and seconded by E. B. Cowell, Esq., as a corresponding member, be named for ballot at the next meeting.

2.—That they had appointed a Committee for the examination of the Stacy coins received through Major Ferris. That the Committee had examined them, and given in their report, stating that, with a few inconsiderable exceptions the coins were correct according to the Catalogue. They had therefore empowered the Committee to order the payment of the sum named for the coins to Captain Wroughton, and to purchase an iron safe, should it be necessary for the security of the collection.

Communications were received—

1.—From the Venerable Archdeacon Pratt, a rejoinder to Capt. Tennant's reply to his paper on the Meridional Arc.

2.—From C. Alabaster, Esq., two catalogues of the bound and unbound Chinese Books in the Society's Library.

Resolved that the thanks of the Society be given to Mr. Alabaster.

3.—From the Officiating Under-Secretary Government of India, copy of a despatch from the Secretary to the Chief Commissioner of the Punjaub, communicating particulars of what has been ascertained regarding the fate of Mons. A. Schlagintweit.

From R. TEMPLE, Esq. Secretary to the Chief Commissioner for the Punjaub.

To G. F. EDMONSTONE, Esq. Secretary to the Government of India Foreign Department, with the Governor General.

Dated Lahore, the 15th October, 1858.

SIR,—I am directed to forward for the information of His Lordship the Governor General, copies of a letter and enclosures from the Commissioner Trans-Sutlej States, dated 5th Instant, from which it appears that Mr. A. Schlagintweit, Magnetic Surveyor, was taken prisoner by the Indijans about twelve or fourteen months ago, and if not killed by them, as is currently rumoured, must be still in captivity.

I have the honor, to be, &c.

W. WYLD, *Captain,*
Assistant Military Secretary, for Secretary.

From Major E. LAKE, Commissioner and Supdt. Trans-Sutlej States.

To R. TEMPLE, Esq., Secretary to Chief Commissioner, Punjaub.

Dated Dhurmsala, the 5th October, 1858.

SIR,—I have the honor to forward for the information of the Chief Commissioner the copy of a letter dated 2nd October, 1858, to my address from the Deputy Commissioner Kangra, together with a translation of the statement of Kutuballee Shah Yarkundee. If his information is to be depended upon, Mr. A. Schlagintweit must have been taken prisoner by the Indijans about twelve or fourteen months ago; and if not killed by them, (as is currently rumoured) must be in captivity.

2. In obedience to demi-official instructions of the Chief Commissioner, Major Taylor deputed in June last, messengers specially to Yarkund for the purpose of procuring more definite intelligence regarding Mr. Schlagintweit. Their return may be shortly expected.

I have the honor, to be, &c.

E. LAKE,

From the Deputy Commissioner, Kangra.

To the Commissioner and Superintendent Trans-Sutlej States.

Dated, Dhurmsala, 2nd October, 1858.

SIR,—I have the honor to subjoin an extract from a demi-official communication from Mr. G. Knox, Assistant Commissioner of Kooloo, together with a translation of the Vernacular statement sent.

2nd. The account has the appearance of being true and circumstantial; if it is so, and the account forwarded by the missionaries from Lahoul has also foundation, Mr. Schlagintweit must have long survived his first capture, as according to the story told to the missionaries he was living unmolested in the neighbourhood of Yarkund in December 1857, when a roving party of Indijans found him and eventually murdered him.

3rd. You will remember that two men from Yarkund whom Mr. Knox had an opportunity of questioning said that Mr. Schlagintweit had gone away with the Indijans.

4th. If I can elicit any thing more from Kuttub Ali Shah, I will report upon it. We may hope to have both Omerdeer's man and the messenger sent by Haree Chund back before the passes are closed.

I have the honor to be, &c.

R. TAYLOR,

Deputy Commissioner.

Statement of KUTTUB ALEE SHAH Yarkundec, taken before Mr. Knox, 28th September, 1858.

Last year in the month of Sawun (July) viz. 14 months ago, the Indijans came to Yarkund to fight with the Kuttæs and Chinese, and I went to Kurghulluck, two days' journey on this side. The Indijans took me and all the Pujabees, Cabulees, Cashmerees and Hindoostanees, in all some 40 or 50 persons, prisoners. At that time two Indijans and a Majanee were accompanying a Sahib who was coming from the Ladak side; these three men ran away with the Sahib's property and came to Kurghulloek, there they stopped in the house of one Kurbun Khujuck and they said to him, We have some property for sale, do you take it. When he had sent for the property and examined it, he found it to consist of 12 or 14 Thans Keenkhah, and some loongees, and some Daryayee, and some other property also, but I did not see it with my own eyes. Kurbun having seen the things, went and reported the fact to Hajee Nussur, Kardar of the Indijans, saying that these men were poor and had nothing of their own, they must have robbed this from somebody. Hajee Nussur sent for them and intimidated them, questioning them as to where they got the property, and whose it was. They at first asserted that the property was their own, but when threatened severely they stated that Mahomed Ameen had brought a Feringhee with him, and this property belonged to that Feringhee, and we have taken it and are escaping with it. Hajee Nussur asked where the Feringhee was, they replied "God knows! He was on his way to Yarkund, if he has gone there he will have arrived at the village of Gullean." Hajee Nussur therefore sent two or three of his own men and told them to go and fetch the Sahib; they therefore went to Gulleau and brought the Sahib from thence to Kur-

ghulluck and Mahomed Ameen was also with him. Nobody understood the Sahib's speech in that country, they searched therefore for somebody who could understand him, in hope of finding some one who could understand Hindoostanee or Punjabee. I was in confinement and they took me to the place. Hajee Nussur told me to ask the Sahib why he had come there. I asked the Sahib. He replied that there was a Shahzada, son of Mihmood Shah, living in the Indijan country, and he had visited him (Mr. Schlagintweit) in Lahore, and had said, Do you come to Indijan, and I will establish friendly relations between the Nawab of Indijan and the Sahibs; that it was on this account that he was on his way to Indijan. Hajee Nassur confiscated all the Sahib's property, and put the Sahib in confinement and sent him to Tullah Khan, a principal Sirdar. When they put the Sahib in confinement, he said to me, "No one here understands my language and my belief is that these people will kill me, should you go to that side of the country, if you go by Koolloo, tell this matter to Hay Sahib; if you go by Cashmere tell it to whatever Sahib you meet." After this the Sahib went away. On the day that the Sahib went to Sirdar Tulla Khan, on the same day, the Chinese force came to fight with the Indijans, and the Indijans fought for half an hour and then ran away, and took the Sahib with them; when the Chinese force came, all the Indijau Kardars ran away, and we, forty or fifty men, who were in confinement, got free. I afterwards heard that Dil Khan the great Chief of the Indijans had taken the Sahib's property, and put him to death, but I only heard this from the report of travellers of Kashgur and Yarkund. I did not see it with my own eyes. *Question.*—Do you know anything of the property of the Sahib or his servants? *Answer.*—No—I do not know anything about them. I only saw the Sahib and Mahomed Ameen Moghul; some also said that Mahomed Ameen also had been killed; others that he was alive; others that he had his nose and ears cut off.

(Signed) *Kuttab Allee Shah Yarkundee.*

Nuggur, 28th September, 1858.

(*Extract.*)

A man has come to-day and gives some intelligence about Mr. Schlagintweit, he says he saw him when the Indijans were taking

him off, and Schlagintweit told him to mention what had occurred. I have taken down in writing his statement and herewith enclose it to you. I have given him a Purwannah as far as Kangra, as from all I see and hear I don't think him a spy or suspicious character. He says he is on his way to Rambag. If you think as I do will you kindly give him a purwannah onward. I send him in person to you, so you can gather much more from him by talking, and much more than I can convey to you in writing.

(Signed) G. KNOX.

4. From Baboo Radha Nauth Sikdar, an abstract of the Meteorological observations taken at the Surveyor General's Office during the months of June and July.

The Officiating Librarian submitted his usual monthly report for November last.

Dr. Thomson gave some account of the Botanical results of a recent visit to Parisnath.

LIBRARY.

The Library has received the following accessions during the month of December, 1858.

Presented.

Athenæum, for August 1858.—BY THE EDITORS.

Indische Studien, Vol. 4. P. 3.—BY DR. WEBER.

Journal of the Statistical Society, London, for September 1858.—BY THE SOCIETY.

The London, Edinburgh and Dublin Philosophical Magazine.—No. 106 for SEPTEMBER, 1858.

Zeitschrift der Deutschen morgenlandischen Gesellschaft.—BY PROF. DR. BROCKHAUS VOL. 12, P. 3., AND AN INDEX OF VOLS. 1—10.

Annalen der Chemie und Pharmacie, Vol. 107, P. 1. for JULY, 1858.

Al-hadirae Diwanus of Al-Yezidii.—BY DR. ENGELMANN.

Bleeker, P. Ichthyologiae Archipelagi Indici Prodromus, Vol. 1, Batavia.—BY DR. CANTOR.

S. M. Le Roi Frederic VII. de Danemark, sur—la construction des salles dites des géants Copenhague, 1857.—BY THE ROYAL SOCIETY OF ANTIQUARIES AT COPENHAGEN.

Rafn. C. C. Inscription Runique du Pireé interpretee.—COPENHAGUE. 1856, DITTO DITTO.

Extrait des Antiquites del' Orient.—COPENHAGUE, 1856.—DITTO.

Antiquarisk Tidsskrift, 1854.—DITTO.

S. M. Frederic VII. Roi de Danemark, Vestiges D'Asserbo et de Soborg decouverts,—COPENHAGUE, 1855.—DITTO.

Rafn. C. C. Antiquites Americaines, COPENHAGUE, 1845, ROYAL 4to.—DITTO.

Saga Jatvardar Konungs Hins, Helga, COPENHAGUE, 1852.—DITTO.

List of Members and of Books published by the Society, pamphlet 1857.—DITTO.

Proceedings of the Royal Society of London, Nos. 27, 28, 29, 31 and 32, 1857-58.—BY THE ROYAL SOCIETY OF LONDON.

List of Fellows of the Royal Society, 1856-57.—DITTO.

Philosophical Transactions of the Royal Society of London, for 1856-57, Vol. 146, Parts 2 and 3, Vol. 147 P. 1 and 2.

Address of the President at the Anniversary Meeting of the Royal Society, 1857.—DITTO.

JOHNSON, M. J. (M. A.) Meteorological Observations made at the Redcliffe Observatory, OXFORD, 1856.—DITTO.

Observations Meteorologiques, faites a Nijne-Taguilsk, Annee 1856,—PARIS 1858, DITTO.

Compte Rendu Annual adresse A. S. Exc. M. de Broeck., Par le directeur de l'observatoire Physique central, Annéé 1855, ST. PETERSBOURG, 1856.—DITTO.

Sir Humphry Davy's Discourses, 1820-26 London.—DITTO.

Report on the adjudication of the Copley Rumford and Royal Medals, London, 1834,—DITTO.

SCHEUTZ, GEORGE AND EDWARD. Specimen Tables calculated and stereomoulded by the Swedish Calculating Machine, London, 1852,—2 COPIES.—DITTO.

Journal of the Academy of Natural Sciences of Philadelphia, New Series Vol. 3. P. 4. 1855-58.—BY THE ACADEMY.

Proceedings of the Academy of Natural Sciences of Philadelphia, Vol. 8, 1856.—DITTO.

Bopp. Franz. Vergleichende Grammatik des Sanscrit, Send, Griechischen, Lateinischen, Littanischen, Altslavischen, Gothischen, und Deutschen. Erster Band, Berlin, 1857.—BY THE AUTHOR.

Journal of the Geological Society of Dublin, Vol. II. P. 1, 2, 3, Vol. III. P. 1, 2, 3, 4, Vol. IV. P. 1, 2, Vol. V. P. 1, 2, 3, and Vol. 6.—BY THE SOCIETY.

The Oriental Baptist for November 1858.—BY THE EDITOR.

Calcutta Christian Observer for Nov. 1858.—BY THE EDITORS.

Bibidharta Sangraha, for Assar.—BY THE EDITOR.

Written defence of Roy Kissory Chand Mittra by Babu R. L. MITTRA.

Report on a project for the supply of Water to the Poona Cantonment, with Plans and sections in a separate case.—BY THE SECRETARY P. WORKS DEPARTMENT.

Sanscrit Wörterbuch Herausgegeben von der Kaiserlichen Akademie der Wissenschaften, by Proffr Bohtlingk and Rudolph Roth. Erster Theil and Zweiter Theil.

The Oriental Christian Spectator for October, 1858.—BY THE EDITOR.

Carrington A. Catalogue of 3735 Circumpolar Stars observed at Redhill, for 1855.—BY THE ROYAL SOCIETY.

Report of the Survey Operations of the Lower Provinces from Oct. 1856 to Sept. 1857.—BY THE GOVT. OF BENGAL.

Defence of Roy Kissory Chund Mittra. From Baboo Rajendralal Mittra.

PURCHASED.

Travels in Central Africa, Vols. 4 and 5—BY DR. BARTH.

Comptes Rendus, Tome 47, Nos. 6, 7, 8, 9.—BY THE ACADEMY OF SCIENCES, PARIS.

The Annals and Magazine of Natural History No. IX. Sept. 1858.

The Literary Gazette, Nos. 7, 8, 9, 10, 11.

Revue des Deux Mondes, for August and Sept. 1858.

Annales des Sciences Naturelles, Tome 8. *Paris.*

Journal des Savants, for August 1858. *Paris.*

Revue et Magasin de Zoologie, No. 7. *Paris.*

Geschichte des Englischen Reiches in Asien, Von Karl Friedrich Neumann, Erster and Zweiter Band, *Leipzig*, 1857.

Gucnee's Suites á Buffon, Histoire des Insectes,—Lepidopteres, Tome IX. *Paris.*

— Planches, 10 Livraison Insectes, Lepidopteres, *Paris.*

Notices et Extraits des manuscrits de la Bibliotheque Imperiale, Tome 16, 17, 18, p. 1st Tome 19, p. 2.

Expedition de Timiour-lenk our Tamerlan, by Mr. Charmoy.

Vendidad Sade, Troisieme Livraison, *Paris*, 1855.—BY MR. JULES THONNELIER.

FOR JANUARY, 1859.

At the Annual General Meeting of the Society held on the 5th January, 1859.

A. Grote, Esq., V. P., in the Chair.

The proceedings commenced by the Secretary reading the following note from the Hon'ble Sir James Colville, Kt., President of the Society, announcing his wish to resign, in consequence of his intended departure from India.

Calcutta, December 24th, 1858.

E. B. COWELL, Esq., *Secretary, Asiatic Society.*

SIR,—My resignation of the office of Chief Justice has been accepted by the Secretary of State for India; and I purpose to leave India at the end of March, 1859.

In this state of things I ought not, I conceive, to be proposed for re-election as President of the Asiatic Society of Bengal, at the approaching annual meeting of the Society. The Society ought then to have the opportunity of electing a President who may be presumed to be capable of performing the duties of the office during the whole year. I beg, therefore, that you will circulate this letter amongst the Members of the Council, in order that they may determine whom they will propose as the next President; I beg also that if there be no objection to that course, this letter may be laid before the Society at its annual meeting.

I am naturally desirous to take that opportunity of expressing my deep sense of the honor which the Society has conferred upon me, in electing me for ten successive years to be its President; and of apologizing for my many short-comings in the discharge of the duties of that office. I have never disguised from myself that I owed this distinction rather to the accident of official rank, than to my personal qualifications for the office. I have always felt that the President of our Society ought to be one who had established some reputation for himself, either in the field of scientific inquiry, or in that of antiquarian research; and I was once most anxious to make way for one who had every qualification which the President of such a Society ought to possess, the late Sir Henry Elliot. His absence from Calcutta frustrated my desires; and I continued to

enjoy the honor annually bestowed upon me, with an undiminished sense of my own unworthiness, and chiefly because I was assured by my friends that my continuance in the Chair was useful to the Society. If it has been so, the result is mainly due to the efficient and friendly co-operation of the gentlemen who have from time to time held the office of Secretary, and of my other colleagues in the Council.

That the Society may find, as it easily may, an able and more efficient President, and may long flourish under him and his successors, is the sincere wish of

Sir,

Your most obedient faithful servant,

JAMES W. COLVILLE.

The Chairman observed that he felt sure that this announcement would be received by the meeting, and by the Society generally, with very great regret. He then moved the following Resolution which was seconded by Mr. C. Beadon.

That the Society, while it congratulates the Hon'ble Sir James Colville on his approaching return to England, desires to express its regret at the loss of his valuable services, and to record its grateful thanks for the zeal and ability with which he has discharged the office of President for the last ten years, and has uniformly exerted himself to promote the objects and interests of the Society.

Carried unanimously.

The Secretary proceeded to read the following report:—

The Council of the Asiatic Society in submitting their usual Annual report, again have to remark with regret, that the continued disturbance of the country appears materially to have interfered with the welfare of the Society.

The total number of Members* now on the rolls is 133, against

* Ordinary. Paying. Absent.

1851	130,	124,	6
1852	139,	122,	17
1853	146,	123,	23
1854	155,	129,	26
1855	162,	123,	34
1856	167,	131,	36
1857	147,	109,	38
1858	133,	95,	38

167 in 1856, and 147 in 1857, shewing a decrease of 34 ordinary Members within the last two years.

The elections during the year have been only two, while the losses have been 16. Of these 11 have been caused by retirement, four by death, and one under bye law 13 of the Society's rules. Of the 133 Members on the rolls, 38 are absent in Europe, and two are life Members, leaving only 93 on the paying list.

Dr. H. Falconer and B. H. Hodgson, Esq., have, on their departure for Europe, been added to the list of honorary Members, and Herr R. Schlagintweit has been elected a corresponding Member of the Society.

The obituary includes the names of four ordinary Members, viz. : the late Bishop Wilson, Lieutenant F. J. Burgess, Dr. F. P. Strong, and Baboo Nogensra Nauth Tagore; of one honorary Member, General Count Ventura; and of one associate, Mr. H. Piddington.

In the Venerable Bishop Wilson, the Society has to regret one who was for many years a zealous Member, and who for ten years held the office of Vice-President.

Mr. Piddington was connected with the Society for nearly thirty years, and at various times served in the capacities of Officiating Secretary, Assistant Secretary, and Curator of the Geological Department. In him the Society has lost a most able and constant contributor to the Journal, and Science an indefatigable votary.

FINANCES.

The loss of a large number of Members, and the difficulty of making remittances from the Mofussil, have seriously affected the income of the Society. The total receipts during the past year have been Rupees 17,206-6-1, whilst those of the preceding year were Rupees 22,504-12-3. The expences have been Rupees 15,088-14-7. To this sum, however, has to be added the cost of the repairs of the Society's premises, Rupees 2,280, which will make the expenditure amount to about the same sum as in 1857.

The income includes a sum of Rupees 500, paid by Rajah Pra-taub Chunder Singh as the amount of his compensation fee, which has been invested in Government securities, and another of Rupees 1,734-16-8, received from the Oriental Fund in liquidation of the advance made to it in 1856.

The liabilities of the Society amount to Rupees 6,810-3-10; to meet which there is a cash balauce in hand to the extent of Rupees 3,451-12-3, Company's paper, to the value of 5,000, and outstanding assets to the amount of Rupees 6,289-10-3. Rupees 2,255-7-3 have been written off in the course of the year as unrealizable.

The probable receipts of the ensuing year may be assumed at Rupees 12,300, and of expenses at Rupees 11,533, the estimate under the usual heads being—

INCOME.

Contributions,	6,000	0	0
Admission Fee,	100	0	0
Government Grant at 300,	3,600	0	0
Sale of Books,	700	0	0
Journal,	1,000	0	0
Interest,	250	0	0
Miscellaeuous,	50	0	0
	<hr/>		
	Rs.	12,300	0 0
	<hr/>		
Monthly average,	1,025	0	0

EXPENDITURE.

Museum,	4,645	0	0
Library Establishment,	936	0	0
Purchase of Books,	500	0	0
Book-binding,	300	0	0
Contingencies,	200	0	0
General Establishment,	1,494	0	0
Journal,	2,500	0	0
Miscellaneous,	500	0	0
Building,	400	0	0
Deposit,	58	0	0
	<hr/>		
	Rs.	11,533	0 0
	<hr/>		
Monthly average,	961	1	4

LIBRARY.

The Library has received important accessions of Scientific and Oriental works to the extent of 300 vols., during the year under report. The presentations from learned Societies and Institutions have been rich and various, and the Society's purchases include most of the leading scientific and other periodicals.

Mr. Chaloner Alabaster has furnished the Society with a Catalogue of the Chinese works in the Library, which will shortly appear in the Journal, and the Librarian is preparing a list of incomplete Works and Transactions of learned Societies, in order that the Vols. wanting may be procured from Europe.

STACY COLLECTION OF COINS.

The Council having been in treaty during the last two years for the purchase of this collection of coins, have at last succeeded in securing it. A Committee which was nominated to examine the coins, reports them to be complete, according to Mr. E. Thomas's Catalogue, with a very few exceptions. The sum of 2,938 Rupees originally subscribed for the purchase of this collection, was realized in full, and the balance, Rupees 1,062, has been made up from the Society's Funds out of the grant of 1,200 Rupees, accorded for that purpose by a special vote. The Committee hope ere long to determine the best means of preserving and exhibiting this valuable collection, together with other coins already in the Society's possession.

MUSEUM.

The repairs of the building having occupied the greater part of the year, the Museum has been closed to public inspection for a lengthened period. The trouble of removing at every successive stage the articles occupying the Society's premises, has protracted the repairs considerably. They have, however, now been completed and the objects in the Museum re-arranged.

JOURNAL.

Owing to the continued troubles of the country, and the consequent hindrance to the prosecution of scientific researches, only 4 Nos. of the Journal have been issued.

ORIENTAL FUND.

It was announced in the last report, that the Oriental Fund would soon be in a position to enable the Editors to complete the unfinished works, and to commence a new series. The Council have since paid off all the liabilities of the Fund which had fallen due, and issued 7 Nos. of the *Bib. Indica*, including portions of 5 different works. Of these 4 have been edited by Babu Rajendra Lal Mitra, 2 by Mr. F. E. Hall, and 1 by Pundit Ishar Chandra Vidyasagara. The names of the works are—

Lalita Vistara, or Memoirs of the Life and Doctrines of Sakya Sinha Fas. III, IV, V, being Nos. 143,144,—145, edited by Baboo Rajendra Lal Mitra.

2. Taittiriya Brahmana of the Black Yajur Veda, with the commentary of Sayanacharya Fas. III. being No. 147, edited by Baboo Rajendra Lal Mitra.

3. The concluding part (Fasc. III.) of the Sankhya Pravachana Bhashya, with an English preface, being No. 141, edited by F. E. Hall, Esq.

4. Sūrya Siddhanta with its commentary, the Gudhartha Prakasaka, Fasc. IV., being No. 146, edited by F. E. Hall, Esq.

5. Sarvadarsana Sangraha; or an Epitome of the different systems of Indian Philosophy, by Mādhavachyarya; Fas. II. being No. 142, edited by Pundit Issurchandra Vidyasagara.

The publication of the Taittiriya Yajur Veda will be resumed during the ensuing year; and the Editors report that they hope very shortly to send the ninth Fas. to the press. The various unfinished works will be completed as speedily as possible, and when any new works are undertaken, it will be done with every regard to the recommendations of Professor H. H. Wilson, and the wishes expressed in the dispatch of the Hon'ble Court of Directors.

OFFICERS.

The Council have had every reason to be satisfied with the zeal and assiduity with which the Curator and the Assistant Secy. have discharged their duties. The latter has obtained leave of absence for 6 months, and his office has been temporarily filled by Baboo Bhubany Persaud Dutt.

The Report was adopted.

The Meeting then proceeded to ballot for the Council and Officers for the ensuing year. Dr. Eatwell and T. Oldham, Esq., were appointed scrutineers, and at the close of the ballot, the Chairman announced the following result:—

- | | |
|---------------------------|----------------------|
| A. Grote Esq., | President. |
| Col. R. Strachey, | } Vice-Presidents. |
| Dr. T. Thomson, | |
| Baboo Ramapersaud Roy, | |
| C. Beadon, Esq. | |
| Dr. T. Boycott. | |
| Baboo Rajendralal Mittra. | |
| E. A. Samuells, Esq. | |
| Baboo Ramgopal Ghose. | |
| T. Oldham, Esq. | |
| Capt. C. H. Dickens. | |
| Capt. W. N. Lees. | |
| Dr. W. Crozier. | |
| W. S. Atkinson, Esq., ... | } Joint-Secretaries. |
| E. B. Cowell, Esq., | |

After acknowledging in a few words the honour which had just been conferred on him, the new President congratulated the meeting on those passages in the Report which announced the resumption of the publication of the *Bib.-Indica*, and the completion of the purchase of the Stacy Cabinet of Coins.

ABSTRACT STATEMENT
OF
RECEIPTS AND DISBURSEMENTS
OF THE
ASIATIC SOCIETY
FOR
THE YEAR, 1858.

STATEMENT
Abstract of the Cash Accounts

		RECEIPTS.			
CONTRIBUTIONS.		1857		1858	
Received from Members,	Rs. 7,068	0 0	6,923	8 0	
			<hr style="width: 100%;"/>		6,923 8 0
ADMISSION FEE.					
Received from new Members, ..	256	0 0	96	0 0	
			<hr style="width: 100%;"/>		96 0 0
JOURNAL.					
Sale proceeds of and Subscription to the Journal of the Asiatic Society,	1,931	10 5	496	3 0	
			<hr style="width: 100%;"/>		496 3 0
LIBRARY.					
Sale proceeds of Books,	1,225	4 0	566	5 9	
Refund by transfer of amount erroneously charged in Messrs. Williams and Norgate's account of 1857, as per contra, ..			170	10 0	
Sale proceeds of old plates, ..			10	0 0	
Ditto duplicate coins, ..			37	12 6	
			<hr style="width: 100%;"/>		784 12 3
MUSEUM ZOOLOGY.					
Received from the General Treasury at 300 Rs. per month, ..	3,600	0 0			3,600 0 0
SECRETARY'S OFFICE,					
Discount on postage Stamps, ..	9	5 6	0	15 0	
Refund of Postage, ..			21	6 6	
Sale proceeds of old Ink Bottles, ..			0	5 0	
			<hr style="width: 100%;"/>		22 10 6
VESTED FUND,					
Interest on Company's Paper from the Bank of Bengal,	240	0 0	220	0 0	
Discount on ditto,			31	6 2	
Interest on 1734-10-8 advanced to the O. P. Fund from 1st January to 30th June, 1858, at 4 per cent.			34	11 1	
			<hr style="width: 100%;"/>		286 1 3
GENERAL ESTABLISHMENT,					
Savings, ..			35	10 5	
Fine, ..			1	0 0	
			<hr style="width: 100%;"/>		36 10 5
DEPOSIT ACCOUNT,					
Lient. H. G. Raverty,	221	5 0	27	0 0	
A. Grote, Esq.			4	4 0	
Major J. G. Stephen,			32	0 0	
Baboo Roodernauth Doss,			11	0 0	
			<hr style="width: 100%;"/>		74 4 0
					<hr style="width: 100%;"/>
Carried over,					12,320 1 5

No. 1.

of the Asiatic Society for 1858.

DISBURSEMENTS.

JOURNAL.	1857	1858
Freight,	77 3 10
Printing charges,	23 11 0
Lithographing,	185 12 0
Commission on Sale of Books,	7 12 0
Purchase of Postage Stamps,	27 8 0
Engraving,	18 0 0
Copying charges,	5 0 0
Petty charges,	7 13 0
	2,450 1 9	352 11 10

LIBRARY.

Salary of the Librarian 12 months at 70 per month, .. .. .	.. .. .	840 0 0
Establishment ditto at 8 per month, .. .. .	.. .. .	96 0 0
Purchase of Books, .. .. .	.. .. .	113 1 0
Ditto a copy of the Panoramic View of Calcutta, .. .. .	.. .. .	6 0 0
Book Binding, .. .. .	.. .. .	422 1 0
Postage, .. .. .	.. .. .	9 0 0
Commission on sale of Books, .. .. .	.. .. .	24 13 9
Cleaning charges, .. .. .	.. .. .	7 14 0
Freight, .. .. .	.. .. .	14 8 10
Extra Duftory, .. .. .	.. .. .	27 12 0
A Wooden Ladder for the Library, .. .. .	.. .. .	6 0 0
Two Blank record Books, .. .. .	.. .. .	5 8 0
Lithographing, .. .. .	.. .. .	2 0 0
Two pieces of new Mat for the Library Room, .. .. .	.. .. .	11 2 9
Repairing Punkha of the ditto, .. .. .	.. .. .	2 0 0
Copying charges, .. .. .	.. .. .	6 0 0
Petty Charges, .. .. .	.. .. .	1 6 6
	6,804 8 6	1,595 3 10

MUSEUM.

Salary of the Curator E. Blyth, Esq. at 250 per month, 12 months, .. .. .	.. .. .	3,000 0 0
House rent at 40 per month, 12 months, .. .. .	.. .. .	480 0 0
Establishment, .. .. .	.. .. .	584 0 6
Contingent charges, .. .. .	.. .. .	233 2 6
Extra Taxidermist's salary, .. .. .	.. .. .	348 4 0
A Blank record Book, .. .. .	.. .. .	5 8 0
Six Glass Cases for Birds, .. .. .	.. .. .	780 0 0
Ten Shelves ditto, .. .. .	.. .. .	33 0 0
	4,496 9 6	5,463 15 0

Carried over, 7,411 14 8

	Brought forward,	12,320	1	5
STACY COIN COLLECTION. 1857				
Subscriptions for the purchase of the Collection,		212	0	0
Amount of last year's subscriptions,	..	2,726	0	0
		<hr/>		
		2,938	0	0

MESSRS. WILLIAMS AND NORGATE.				
Received through Rajah Radhacant Deva, duty on parcels,	.. ..	26	0	0
Proceeds of sundry books sold on their account of Weber's Modern Investigations on Ancient India, .. ..	.. ..	1	0	0
Ditto ditto a copy of Muller's Bnddhism, ..	..	1	0	0
Ditto ditto a copy of Bopp's Comparative Grammar, .. ..	.. ..	25	0	0
Ditto ditto a copy of Goldstüker's Sanscrit Dictionary, .. ..	.. ..	5	0	0
Ditto ditto White Yajurveda, Vol. I. ..	..	32	8	0
		4,419	8	5
		<hr/>		
		90	8	0

ORIENTAL PUBLICATION FUND.				
Received from the Oriental Publication Fund, ..		765	5	4
		<hr/>		
		1,734	10	8

PROFIT & LOSS.				
Received from the Administrator General's Office being a dividend on account Capt. W. E. Boyes' contributions, in part of amount written off in 1856, .. ..	.. ..	104	6	0
Ditto ditto Oriental Bank on a Bill for 50£., ..	..	2	10	0
Ditto ditto Muddoosoodun Dey, sale proceeds of a copy of the Mahabharata, in part of amount written off in 1856, .. ..	.. ..	15	0	0
		<hr/>		
		122	0	0

DR. J. FAYRER.				
Refund of Postage, .. ..	.. ..	1	2	0
		<hr/>		
		1	2	0

BALANCE OF 1857.				
Bank of Bengal, .. ..	.. ..	2,321	11	3
Cash in hand, .. ..	.. ..	8	14	0
		<hr/>		
		2,330	9	3
Inefficient Balance, .. ..	.. ..	581	15	3

Carried over,

 20,118 14 7

			Brought forward, 7,411 14 8		
SECRETARY'S OFFICE.			1857		
General Establishment, ..	..	..	822	0	0
Secretary's Office Establishment, ..	..	..	672	0	0
Copying charges, ..	..	..	10	0	0
Postage,.. ..	..	..	9	0	6
Stationery, ..	..	..	75	6	3
Three Blank Books for writing, ..	..	..	16	8	0
Purchase of Postage Stamps, ..	..	..	13	11	0
Freight, ..	..	..	14	0	0
A Sheet Almanac for 1858, ..	..	..	1	0	0
Petty charges, ..	..	..	27	7	0
			1,739	0	9
			<hr/>		
				1,661	0 9

BUILDING.

Assessment, ..	..	..	..	281	4	0
Ditto for Lighting, ..	..	..	..	75	0	0
			895	2	6	
			<hr/>			
				356	4	0

STACY COIN COLLECTION.

Paid to Major W. S. Ferris, on account of						
Mrs. Wroughton, for the Stacy Coins, as						
per receipt, ..	..	..	..	4,000	0	0
Ditto a Lock for the Coin-Box, ..	..	..	..	3	0	0
				<hr/>		
				4,003	0	0

DEPOSIT ACCOUNT.

Rev. H. Hislop, ..	..	..	..	16	11	0
Lieut. C. J. Terrot, ..	..	..	..	9	0	0
Rev. Isider Lowenthall, ..	..	..	..	9	0	0
Baboo Roodernauth Doss, ..	..	..	..	9	0	0
Lieut. H. G. Raverty, ..	..	..	..	117	0	0
Hon'ble Sir J. W. Colville, Kt. ..	..	..	..	3	0	0
A. Grote, Esq. ..	..	..	..	4	4	0
			155	15	0	
			<hr/>			
				167	15	0

VESTED FUND.

Paid Commission for the Collection of Interest						
on Company's Paper,						
			..	0	8	10
Ditto Interest on Company's Paper,						
			..	2	6	11
Ditto for Purchase of Government Security at						
5 per cent. No. 51,090, dated 28th February,						
1856-57,						
			..	500	0	0
			4,021	8	9	
			<hr/>			
				502	15	9

J. S. LAW, ESQ.

Paid Freight on his account, ..	..	..	..	4	2	0
				<hr/>		
				4	2	0
				<hr/>		
			Carried over,	14,107	4	2

Brought forward, 20,118 14 7

3

Co.'s Rs. 20,118 14 7

1857
Brought, forward, 1858
14,107 4 2

MESSRS. WILLIAMS AND NORGATE.

Amount debited by transfer being erroneously entered in their account of 1857, in the following items.

6 Bopp's Comparative Grammar, ..	£12 12 0			
25 Weber's Ancient India, ..	0 18 9			
15 Muller's Buddhism, ..	0 17 6			
		£14 8 3 at 2s. p.		
		rupee 144 2 0		
Ditto ditto duty on Parcels, ..	26 8 0			
			170 10 0	
Commission on sale of Books, ..			2 8 0	
Freight,			4 4 0	
Purchase of Books on their account, ..			21 8 0	
Bills on Oriental Bank Corporation at London, ..				
£50-5-3 at 2s.			502 10 0	
Packing charges,			0 9 11	
		2,970 11 4		702 1 11

MISCELLANEOUS.

Advertising Meeting,			14 6 0	
Meeting charges,			152 0 0	
Polishing a Table,			7 12 3	
New Mat for the Room,			8 11 0	
White-washing a Punkha for the Meeting Room, ..			6 6 0	
Illumination of the Asiatic Society's Rooms on the 1st of November,			65 15 3	
Petty charges,			24 6 0	
		432 15 0		279 8 6
				15,088 14 7

BALANCE.

Bank of Bengal,			3,442 3 5	
In hand,			9 8 10	
			3,451 12 3	
Inefficient Balance,			1,578 3 9	
				5,030 0 0
				Co.'s Rs. 20,118 14 7

STATEMENT
Abstract of the Oriental

	1857	1858
BALANCE OF 1857,		
Bank of Bengal, ..	3,059 9 0	
Cash in hand, ..	29 4 9	3,088 13 9
		<hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
Inefficient Balance, ..	..	2,112 14 8
		5,201 12 5
SALE OF ORIENTAL PUBLICATIONS,		
Received by Sale of Bib. Indica, ..	781 8 0	
Ditto by Subscription to ditto, ..	187 10 0	
Ditto by Sale of White Yajurveda, ..	46 4 0	
	1,157 11 4	<hr style="width: 50%; margin-left: auto; margin-right: 0;"/>
		1,015 6 9
GOVERNMENT ALLOWANCE,		
Received from General Treasury at 500 per month, ..	6,000 0 0	6,000 0 0
VESTED FUND.		
Interest on Company's Paper from Bank of Bengal, ..	210 0 0	140 0 0
DEPOSIT ACCOUNT.		
Received from Mahomed Hajee, ..		43 11 0
CUSTODY OF ORIENTAL WORKS.		
Savings of Establishment, ..	2 0 0	3 0 0
PROFIT AND LOSS.		
Received from the Administrator General's Office being a dividend on account of J. Reddie, Esq. ..	..	0 12 3

Carried over,

 12,404 9 8

No. 2.

Fund for the year 1858.

	1857	1858
SALE OF ORIENTAL PUBLICATIONS.		
Commission on Sale of Books, ..	53 13 6	42 8 0
VESTED FUND.		
Commission paid to the Bank of Bengal for Collecting Interest on Company's Paper, ..		0 5 8
Interest paid to the Asiatic Society on the Loan of Rs. 1,734-10-8,	34 11 1	
	100 8 6	35 0 9
CUSTODY OF ORIENTAL WORKS.		
Salary of Librarian, at 30 per month, ..	360 0 0	
Establishment,	156 0 0	
Book binding,	329 0 0	
Books cleaning,	34 12 9	
A blank book for writing,	1 8 0	
Twenty Stone Pedestals for the Admirahs of the Library,	10 0 0	
Ticca writer for examining the list of Sanserit Books,	20 0 0	
	683 0 0	911 4 9
ASIATIC SOCIETY.		
Paid to the Society on account of Loan in full,		1,734 10 8
COPYING MSS.		
Copying Charges,	80 3 9	36 8 0
BIB. INDICA,		
Freight,	20 8 4	
Examining and making a list of the above, ..	5 0 0	
Packing Charges,	2 4 0	
Postage Stamps,	2 1 0	
A blank Acct. book,	0 14 0	
		30 11 4
KITAB-UL MAABRAF,		
Printing Charges,		122 8 0
TAI'TTIRIYA BRAHMANA',		
Printing Charges,		1,141 14 0
VEDA NTA SUTRAS,		
Printing Charges,		36 8 0
		Carried over, 4,091 9 6

Brought forward, 12,404 9 8

Co.'s Rs. 12,404 9 8

Asiatic Society's Rooms
31st Dec. 1858.

Examined,
BHOBANYPROSAD DUTT,
Offg. Asst. Secy.

				Brought forward,	4,091	9	6
ITQUAN.							
Printing Charges,	..	..	..	..	66	14	0
SARVADABSHANA SA'NGRAHA.							
Printing Charges,	..	..	..	..	207	4	0
LALITA VISTARA.							
Printing Charges,	..	..	..	..	450	0	0
SA'NKHYA PRAVACHANA BHA'SHYA.							
Printing Charges,	..	..	..	..	182	8	0
FATU'HUL SHAM.							
Editing Charges,	..	..	..	..	104	0	0
FATU'HUL A'BU' ISMAIL,							
Editing Charges,	..	..	..	..	128	8	0
					<hr/>		
					5,230	11	6
BALANCE.							
Bank of Bengal,	..	..	..	5,052	1	7	
In hand,	..	..	..	5	0	5	
				<hr/>			
				5,057	2	0	
Inefficient Balance,	..	..	..	2,116	12	2	
				<hr/>			
					7,173	14	2
				<hr/>			
				Co.'s Rs.	12,404	9	8
				<hr/>			

Errors Excepted.

E. B. COWELL,
Secretary.

LIST OF ORDINARY MEMBERS
OF THE
ASIATIC SOCIETY OF BENGAL,

ON THE 31ST DECEMBER, 1858.

The * distinguishes non-subscribing Members.

-
- Abbott, Lieut.-Col. J. Artillery, Jullunder.
 *Allen, C. Esq., B. C. S., Europe.
 *Anderson, Lieut.-Col. W. Bengal Artillery, Europe.
 Atkinson, W. S. Esquire, Calcutta.
 Avdall, J. Esquire, Calcutta.
 *Baker, Lieut.-Col. W. E. Bengal Engineers, Europe.
 Batten, J. H. Esquire, B. C. S. Cawnpore.
 Beadon, C. Esquire, B. C. S., Calcutta.
 Beaufort, F. L. Esquire, B. C. S., Calcutta.
 *Beckwith, J. Esquire, Europe.
 *Benson, Lieut.-Col. R., Europe.
 Birch, Major Genl. R. J., H. C. B., Calcutta.
 Bivar, Capt. H. S. 18th Regt. B. N. I., Assam.
 Blgrave, Capt. T. C. 26th Regt. B. N. I., Trans-Sutledge Provinces.
 Blanford, H. F. Esquire, Calcutta.
 Blundell, E. A. Esquire, Singapore.
 *Bogle, Lieut.-Col. Sir A. Kt., Europe.
 Boycott, Dr. T. Bombay M. S., Calcutta.
 *Brodie, Capt. T. 5th Regt. B. N. I., Europe.
 Busheerooddeen Sultan Mahamed Sahib, Calcutta.

- Chapman, C. E. Esquire, B. C. S., Rajshaye.
 Chapman, R. B. Esquire, B. C. S., Calcutta.
 Colvile, Hon'ble Sir J. W. Kt., Calcutta.
 *Colvin, B. J. Esquire, B. C. S., Europe.
 *Colvin, J. H. B. Esq., B. C. S., Europe.
 Cowell, E. B. Esq., B. A. Calcutta.
 Crozier, Dr. William, B. M. S., Calcutta.
 Dalton, Capt. E. S. 9th Regt. B. N. I., Chybassa.
 De Bourbel, Lieut. R. Bengal Engrs., Barrackpore.
 Dickens, Capt. C. H., Calcutta.
 Drummond, Hon'ble E., B. C. S., Calcutta.
 Eatwell, Dr. W. C. B., Calcutta,
 *Edgeworth, M. P. Esq., B. C. S., Europe.
 Elliott, Hon'ble W., M. C. S., Madras.
 Ellis, Major R. R. 23rd Regt. B. N. I., Bundelkund.
 Elphinstone, Lieut. N. W. 4th Regt. B. N. I., Goorgariah.
 Erskine, Major W. C. Commr. of Sagur, Nurbudda Territories,
 Jubbulpore.
 *Fayrer, Dr. J., B. M. S., Europe.
 Freeling, G. H. Esq., B. C. S., Hameerpore.
 Fytche, Major A. 70th Regt. B. N. I., Bassein.
 *Gladstone, W. Esq., Europe.
 Govinchundra Sena, Baboo, Calcutta.
 *Grapel, W. M. A. Esq., Europe.
 Grote, A. Esq., B. C. S., Calcutta.
 Hall, F. E. Esq., M. A., Sagur.
 Halsey, W. S. Esq., B. C. S., Europe.
 *Hamilton, R. Esq., China.
 Hamilton, Sir, R. N. E. Bart., B. C. S., Indore.
 Hannington, Lieut.-Col. J. C. 63rd Regt. N. I., Berhampore.
 Hearsay, Major Genl. J. B., K. C. B. 10th Light Cavalry, Barrack-
 pore.
 Herschel, W. J. Esq., B. C. S., Jungipore.
 *Hichens, Lieut. W. Bengal Engineers, Europe.
 Ishureepershad Singh, Rajah, Benares.
 *Jackson, L. S. Esq., Europe.
 *Jackson, W. B. Esq., B. C. S., Europe.

- Jadava Kishna Singh, Baboo, Calcutta.
- *James, Capt. H. C. 32nd Regt. B. N. I., Europe.
- Jerdon, T. C. Esq., M. M. S., Gazeepore.
- *Johnstone, J. Esq., Europe.
- Joygopaul Bysack, Baboo, Calcutta.
- Kabeeroodeen Ahmed Shah, Bahadoor, Sassaram.
- Kaliprasunno Singh, Baboo, Calcutta.
- Kay, Rev. W., D.D., Bishop's College.
- *Laidlay, J. W. Esq., Europe.
- Layard, Capt. F. P. 19th Regt. B. N. I., Berhampore.
- Lees, Capt. W. N., M. A. 42nd Regt. B. N. I., Calcutta.
- *Liebig, Dr. G. Von, B. M. S., Europe.
- Loch, G. Esq., B. C. S., Calcutta.
- Loftie, Lieut.-Col. M. E., Nusserabad.
- *Low, Major Genl. Hon'ble J., Europe.
- Lushington, F. A. Esq., B. C. S., Calcutta.
- Maclagan, Capt. R., Roorkee.
- Macleod, D. F. Esq., B. C. S., Lahore.
- Macrae, Dr. A. C., B. M. S., Calcutta.
- Manickjee Rustomjee, Esq., Calcutta.
- *Marshman, J. C. Esq., Europe.
- *Middleton, J. Esq., Europe.
- Medlicott, J. G. Esq., Calcutta.
- *Mills, A. J. M. Esq., B. C. S., Europe.
- *Money, D. J. Esq., B. C. S., Europe.
- Money, J. W. B. Esq., Calcutta.
- Morris, G. G. Esq., B. C. S., Moughyr.
- Morton, D. T. Esq., M. D., Rangoon.
- *Muir, J. Esq., Europe.
- Muir, W. Esq., B. C. S., Allahabad.
- *Nicholls, Capt. W. T. 24th Regt. M. N. I., Europe.
- Oldham, T. Esq., F. R. S., Calcutta.
- O'Shaughnessy, Sir W. B., Bangalore.
- *Ouseley, Major W. R., Europe.
- *Phayre, Lt.-Colonel A., Rangoon.
- Prasunnonath Roy, Rajah, Bahadoor, Degaputti, Rajshaye.
- Pratt, the Venerable Archdeacon, J. H., Calcutta.

- Pratápchandra Sinha, Rajah, Calcutta.
 *Prinsep, C. R. Esq., Europe.
 Prasannacumár Tagore, Baboo, Calcutta.
 Rádhánáth Sikdar, Baboo, Calcutta.
 Rajendrá Dutt, Baboo, Calcutta.
 Rajendrálál Mitra, Baboo, Calcutta.
 Ramánáth Tagore, Baboo, Calcutta.
 Ramáprasad Roy, Baboo, Calcutta.
 Rámchándra Sinha, Rajah, Calcutta.
 Rámgopál Ghose, Baboo, Calcutta.
 *Riddell, H. P. Esq., B. C. S., Europe.
 Roberts, A. Esq., B. C. S., Lahore.
 Röer, Dr. E., Cuttack.
 *Rogers, Capt. T. E., Europe.
 *Royle, Dr. J., F. R. S., Europe.
 *Russell, R. H. Esq., Europe.
 Samuells, E. A. Esq., B. C. S., Calcutta.
 Saxton, Capt. G. H. 38th M. N. I., Cuttack.
 Schiller, F. Esq., Calcutta.
 Sherwill, Capt. W. S. 66th Regt. B. N. I., Dum Dum.
 *Smith, Col. J. T., Europe.
 Smith, Rev. W. O., Calcutta.
 Spankie, R. Esq., B. C. S., Saharunpore.
 *Sprenger, Dr. A., Europe.
 *Stephen, Major J. G. 8th N. I., Europe.
 Strachey, Lieut.-Col. R., Calcutta.
 Strachey, J. E. Esq., B. C. S., Calcutta.
 Sutherland, H. C. Esq., B. C. S., Tipperah.
 Satyasharana Ghosal, Rajá, Calcutta.
 *Thomas, E. Esq., B. C. S., Europe.
 Thomson, T., M. D., F. R. S., Botanical Gardens.
 Thornhill, C. B. Esq., B. C. S., Allahabad.
 Thuillier, Major H. L. Artillery, Calcutta.
 Trevor, C. B. Esq., B. C. S., Calcutta.
 Ward, J. J. Esq., B. C. S., Cuttack.
 Watson, J. Esq., B. C. S., Monghyr.
 Waugh, Col. A. S. Engineers, Derra Dhoon.

Woodrow, H. Esq., Calcutta.

Young, Capt. C. B. Bengal Engrs., Calcutta.

Yule, Capt. H. Bengal Engrs., Calcutta.

ELECTIONS IN 1858.

Baboo Kaliprasunno Singh, Calcutta.

H. C. Sutherland, Esq., C. S., Tipperah.

LOSS OF MEMBERS DURING THE YEAR 1858.

By retirement.

Seton Karr, W. Esq., Jessore.

R. N. Cust, Esq., Allahabad.

C. Gubbins, Esq., Europe.

J. J. Gray, Esq., Maldah.

Hossein Ally Mohumed, His Highness, Ex-Ameer of Scinde, Calcutta.

Jenkins, Lieut.-Col. F., Assam.

Row, Dr. J., Meerut.

Thurburn, Capt. F. A. V., Lucknow.

Campbell, Dr. A., Darjiling.

By Death.

Dr. F. P. Strong, England.

Right Rev. D. Wilson, Lord Bishop, Calcutta.

Lieut. F. J. Burges, 17th Regt. B. N. I., Nowgong.

Baboo Nogensra Nauth Tagore, Calcutta.

H. Piddington, Esq., *Associate Member*, Calcutta.

General Count Ventura, Hony. Member, Europe.

Loch, T. C. Esq., B. C. S., Europe.

LIST OF HONORARY MEMBERS.

M. Garcin de Tassy, Membre de l' Institut, Paris.

Sir John Phillippart, London.

Count De Noe, Paris.
 Prof. Francis Bopp, Memb. de l' Academie de Berlin.
 Sir J. F. W. Herschel, F. R. S. London.
 Col. W. H. Sykes, F. R. S. Do.
 Prof. Lea, Philladelphia.
 Prof. H. H. Wilson, F. R. S., London.
 Prof. C. Lassen, Bonn.
 Sir G. T. Staunton, Bart., F. R. S., London.
 M. Reinaud, Memb. de l' Instit, Prof. de l' Arabe, Paris.
 Dr. Ewald, Gottingen.
 His Highness Hekekyan Bey, Egypt.
 Right Hon'ble Sir Edward Ryan, Kt., London.
 Prof. Jules Mohl, Memb. de l' Instit, Paris.
 Col. W. Munro, London.
 His Highness the Nawab Nazim of Bengal, Murshedabad.
 Dr. J. D. Hooker, R. N., F. R. S., London.
 Prof. Henry, Princetou, United States.
 Lieut.-Col. Sir C. H. Rawlinson, London.
 Lieut.-Col. Sir Proby T. Cautley, K. C. B., London.
 Rájá Rádhákánta Devá Bahádur, Calcutta.
 B. H. Hodgson, Esq., Europe.
 Dr. H. Falconer, F. R. S., B. M. S., Europe.

CORRESPONDING MEMBERS.

Kremer, Mons. A. Von, Alexandria.
 Porter, Rev. J., Damascus.
 Schlagintweit, Mons. H.
 Schlagintweit, Mons. R.
 Smith, Dr. E., Beyrout.
 Tailor, J. Esq., Bussorah.
 Wilson, Dr., Bombay.
 Nietner, J. Esq., Colombo, Ceylon.
 Schlagintweit, Mons. A.

ASSOCIATE MEMBERS.

Blyth, E. Esq., Calcutta.

Káramut, Ali, Syud, Matawalli, Hooghly.

Long, Rev. J., Calcutta.

MacGowan, Rev. J., Ningpo.

Stephenson, J. Esq., Europe.

Tregear, V. Esq., Bareilly.

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*Meteorological Observations.*

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1859.*

Latitude 22° 33' 1" North. Longitude 88° 20' 34" East.

Feet.  
Height of the Cistern of the Standard Barometer above the Sea level, 18.11

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Date. | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>during the day. |                   |                  | Mean Dry Bulb<br>Thermometer. | Range of the Tempera-<br>ture during the day. |           |           |
|-------|-------------------------------------------------|-------------------------------------------|-------------------|------------------|-------------------------------|-----------------------------------------------|-----------|-----------|
|       |                                                 | Max.                                      | Min.              | Diff.            |                               | Max.                                          | Min.      | Diff.     |
| 1     | Inches.<br>30.032                               | Inches.<br>30.120                         | Inches.<br>29.953 | Inches.<br>0.167 | o<br>65.8                     | o<br>74.4                                     | o<br>59.6 | o<br>14.8 |
| 2     | <i>Sunday.</i>                                  |                                           |                   |                  |                               |                                               |           |           |
| 3     | .057                                            | .128                                      | 30.006            | .122             | 66.5                          | 75.6                                          | 58.6      | 17.0      |
| 4     | .027                                            | .112                                      | 29.958            | .154             | 67.6                          | 77.2                                          | 61.4      | 15.8      |
| 5     | 29.998                                          | .074                                      | .958              | .116             | 69.0                          | 76.4                                          | 62.6      | 13.8      |
| 6     | 30.014                                          | .093                                      | .953              | .140             | 70.1                          | 76.5                                          | 66.4      | 10.1      |
| 7     | .032                                            | .131                                      | .974              | .157             | 69.7                          | 79.6                                          | 61.0      | 18.6      |
| 8     | .062                                            | .138                                      | .994              | .144             | 67.6                          | 75.4                                          | 61.8      | 13.6      |
| 9     | <i>Sunday.</i>                                  |                                           |                   |                  |                               |                                               |           |           |
| 10    | .054                                            | .138                                      | .992              | .146             | 67.8                          | 77.2                                          | 60.9      | 16.3      |
| 11    | .070                                            | .163                                      | 30.001            | .162             | 68.0                          | 78.1                                          | 59.8      | 18.3      |
| 12    | .065                                            | .160                                      | 29.997            | .163             | 68.4                          | 78.0                                          | 59.9      | 18.1      |
| 13    | .044                                            | .135                                      | .995              | .140             | 68.2                          | 78.6                                          | 60.0      | 18.6      |
| 14    | .029                                            | .100                                      | .979              | .121             | 68.9                          | 79.2                                          | 61.6      | 17.6      |
| 15    | .057                                            | .134                                      | 30.011            | .123             | 69.4                          | 79.8                                          | 61.2      | 18.6      |
| 16    | <i>Sunday.</i>                                  |                                           |                   |                  |                               |                                               |           |           |
| 17    | .067                                            | .148                                      | .007              | .141             | 69.6                          | 78.6                                          | 63.8      | 14.8      |
| 18    | .018                                            | .096                                      | 29.947            | .149             | 69.4                          | 79.2                                          | 60.8      | 18.4      |
| 19    | 29.938                                          | .025                                      | .885              | .140             | 69.0                          | 79.6                                          | 60.4      | 19.2      |
| 20    | .933                                            | 29.993                                    | .891              | .102             | 71.1                          | 82.8                                          | 62.6      | 20.2      |
| 21    | 30.005                                          | 30.105                                    | .952              | .153             | 69.2                          | 78.2                                          | 62.8      | 15.4      |
| 22    | 29.959                                          | .069                                      | .888              | .181             | 66.0                          | 76.8                                          | 57.0      | 19.8      |
| 23    | <i>Sunday.</i>                                  |                                           |                   |                  |                               |                                               |           |           |
| 24    | .914                                            | .000                                      | .866              | .134             | 67.5                          | 79.2                                          | 57.6      | 21.6      |
| 25    | .928                                            | .021                                      | .870              | .151             | 68.7                          | 81.2                                          | 58.4      | 22.8      |
| 26    | .906                                            | 29.975                                    | .851              | .124             | 70.5                          | 83.6                                          | 60.2      | 23.4      |
| 27    | .969                                            | 30.037                                    | .925              | .112             | 70.8                          | 82.0                                          | 61.0      | 21.0      |
| 28    | .993                                            | .077                                      | .941              | .136             | 71.0                          | 82.3                                          | 61.0      | 21.3      |
| 29    | .964                                            | .059                                      | .905              | .154             | 71.9                          | 81.4                                          | 62.0      | 22.4      |
| 30    | <i>Sunday.</i>                                  |                                           |                   |                  |                               |                                               |           |           |
| 31    | .914                                            | 29.976                                    | .859              | .117             | 74.3                          | 85.2                                          | 66.0      | 19.2      |

The Mean height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the twenty-four hourly observations made during the day.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1859.*

Daily Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Date. | Mean Wet Bulb Ther-<br>mometer. | Dry Bulb above Wet. | Computed Dew Point. | Dry Bulb above Dew<br>Point. | Mean Elastic force of<br>Vapour. | Mean Weight of Vapour<br>in a cubic foot of air. | Additional Weight of Va-<br>pour required for com-<br>plete saturation. | Mean degree of Humi-<br>dity, complete satura-<br>tion being unity. |
|-------|---------------------------------|---------------------|---------------------|------------------------------|----------------------------------|--------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|
|       | o                               | o                   | o                   | o                            | Inches.                          | T. gr.                                           | T. gr.                                                                  |                                                                     |
| 1     | 59.3                            | 6.5                 | 55.4                | 10.4                         | 0.449                            | 4.98                                             | 2.06                                                                    | 0.71                                                                |
| 2     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 3     | 61.6                            | 4.9                 | 58.7                | 7.8                          | .501                             | 5.55                                             | 1.64                                                                    | .77                                                                 |
| 4     | 63.4                            | 4.2                 | 60.9                | 6.7                          | .539                             | .96                                              | .48                                                                     | .80                                                                 |
| 5     | 65.1                            | 3.9                 | 63.1                | 5.9                          | .580                             | 6.39                                             | .37                                                                     | .82                                                                 |
| 6     | 66.3                            | 3.8                 | 64.4                | 5.7                          | .605                             | .66                                              | .37                                                                     | .83                                                                 |
| 7     | 64.0                            | 5.7                 | 61.1                | 8.6                          | .543                             | 5.97                                             | .96                                                                     | .75                                                                 |
| 8     | 61.7                            | 5.9                 | 58.2                | 9.4                          | .493                             | .45                                              | .99                                                                     | .73                                                                 |
| 9     | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 10    | 62.5                            | 5.3                 | 59.3                | 8.5                          | .511                             | .64                                              | .84                                                                     | .75                                                                 |
| 11    | 62.8                            | 5.2                 | 59.7                | 8.3                          | .518                             | .73                                              | .80                                                                     | .76                                                                 |
| 12    | 62.9                            | 5.5                 | 59.6                | 8.8                          | .516                             | .70                                              | .92                                                                     | .75                                                                 |
| 13    | 63.1                            | 5.1                 | 60.0                | 8.2                          | .523                             | .78                                              | .80                                                                     | .76                                                                 |
| 14    | 64.0                            | 4.9                 | 61.5                | 7.4                          | .550                             | 6.07                                             | .67                                                                     | .78                                                                 |
| 15    | 64.1                            | 5.3                 | 61.4                | 8.0                          | .548                             | .04                                              | .82                                                                     | .77                                                                 |
| 16    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 17    | 63.9                            | 5.7                 | 61.0                | 8.6                          | .541                             | 5.95                                             | .95                                                                     | .75                                                                 |
| 18    | 62.9                            | 6.5                 | 59.6                | 9.8                          | .516                             | .68                                              | 2.18                                                                    | .72                                                                 |
| 19    | 62.9                            | 6.1                 | 59.8                | 9.2                          | .520                             | .73                                              | .03                                                                     | .74                                                                 |
| 20    | 64.9                            | 6.2                 | 61.8                | 9.3                          | .555                             | 6.10                                             | .18                                                                     | .74                                                                 |
| 21    | 62.2                            | 7.0                 | 58.7                | 10.5                         | .501                             | 5.52                                             | .29                                                                     | .71                                                                 |
| 22    | 58.2                            | 7.8                 | 53.5                | 12.5                         | .421                             | 4.67                                             | .41                                                                     | .66                                                                 |
| 23    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 24    | 60.8                            | 6.7                 | 56.8                | 10.7                         | .470                             | 5.19                                             | .23                                                                     | .70                                                                 |
| 25    | 62.5                            | 6.2                 | 59.4                | 9.3                          | .513                             | .66                                              | .03                                                                     | .74                                                                 |
| 26    | 63.6                            | 6.9                 | 60.1                | 10.4                         | .525                             | .77                                              | .36                                                                     | .71                                                                 |
| 27    | 64.0                            | 6.8                 | 60.6                | 10.2                         | .534                             | .86                                              | .34                                                                     | .72                                                                 |
| 28    | 64.6                            | 6.4                 | 61.4                | 9.6                          | .518                             | 6.02                                             | .23                                                                     | .73                                                                 |
| 29    | 65.5                            | 6.4                 | 62.3                | 9.6                          | .565                             | .18                                              | .30                                                                     | .73                                                                 |
| 30    | <i>Sunday.</i>                  |                     |                     |                              |                                  |                                                  |                                                                         |                                                                     |
| 31    | 68.0                            | 6.3                 | 64.8                | 9.5                          | .613                             | .69                                              | .43                                                                     | .73                                                                 |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1859.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.

| Hour.          | Mean Height of<br>the Barometer<br>at 32° Fahr. | Range of the Barometer<br>for each hour during<br>the month. |         |         | Mean Dry Bulb<br>Thermometer. | Range of the Temperature<br>for each hour during<br>the month. |      |       |
|----------------|-------------------------------------------------|--------------------------------------------------------------|---------|---------|-------------------------------|----------------------------------------------------------------|------|-------|
|                |                                                 | Max.                                                         | Min.    | Diff.   |                               | Max.                                                           | Min. | Diff. |
|                | Inches.                                         | Inches.                                                      | Inches. | Inches. | o                             | o                                                              | o    | o     |
| Mid-<br>night. | 30.002                                          | 30.093                                                       | 29.907  | 0.186   | 65.0                          | 70.0                                                           | 60.8 | 9.2   |
| 1              | 29.996                                          | .089                                                         | .894    | .195    | 64.2                          | 69.6                                                           | 60.2 | 9.4   |
| 2              | .988                                            | .078                                                         | .885    | .193    | 63.5                          | 69.0                                                           | 59.7 | 9.3   |
| 3              | .982                                            | .065                                                         | .878    | .187    | 62.9                          | 68.9                                                           | 59.6 | 9.3   |
| 4              | .977                                            | .060                                                         | .871    | .189    | 62.4                          | 68.2                                                           | 58.8 | 9.4   |
| 5              | .988                                            | .070                                                         | .879    | .191    | 62.0                          | 67.0                                                           | 58.3 | 8.7   |
| 6              | 30.003                                          | .084                                                         | .896    | .188    | 61.5                          | 67.0                                                           | 57.0 | 10.0  |
| 7              | .027                                            | .101                                                         | .922    | .179    | 61.1                          | 66.0                                                           | 57.0 | 9.0   |
| 8              | .060                                            | .143                                                         | .951    | .192    | 61.6                          | 68.6                                                           | 60.7 | 7.9   |
| 9              | .079                                            | .154                                                         | .965    | .189    | 67.9                          | 71.6                                                           | 64.2 | 7.4   |
| 10             | .084                                            | .163                                                         | .975    | .188    | 70.8                          | 74.6                                                           | 67.0 | 7.6   |
| 11             | .063                                            | .141                                                         | .959    | .182    | 73.7                          | 77.4                                                           | 69.0 | 8.4   |
| Noon.          | .031                                            | .107                                                         | .921    | .186    | 76.2                          | 81.0                                                           | 71.6 | 9.4   |
| 1              | 29.999                                          | .082                                                         | .896    | .186    | 78.0                          | 83.4                                                           | 74.0 | 9.4   |
| 2              | .972                                            | .047                                                         | .864    | .183    | 78.9                          | 85.0                                                           | 74.2 | 10.8  |
| 3              | .954                                            | .031                                                         | .852    | .179    | 79.1                          | 85.2                                                           | 74.4 | 10.8  |
| 4              | .948                                            | .030                                                         | .851    | .179    | 77.1                          | 83.7                                                           | 71.5 | 12.2  |
| 5              | .953                                            | .037                                                         | .853    | .184    | 75.3                          | 82.2                                                           | 70.1 | 12.1  |
| 6              | .961                                            | .043                                                         | .868    | .175    | 72.9                          | 78.8                                                           | 67.4 | 11.4  |
| 7              | .977                                            | .062                                                         | .892    | .170    | 70.6                          | 76.2                                                           | 65.8 | 10.4  |
| 8              | .991                                            | .075                                                         | .908    | .167    | 69.0                          | 74.8                                                           | 64.6 | 10.2  |
| 9              | 30.002                                          | .087                                                         | .922    | .165    | 67.8                          | 73.2                                                           | 63.0 | 10.2  |
| 10             | .006                                            | .127                                                         | .920    | .207    | 66.8                          | 72.6                                                           | 62.0 | 10.6  |
| 11             | .000                                            | .092                                                         | .922    | .170    | 65.9                          | 72.0                                                           | 61.2 | 10.8  |

The Mean Height of the Barometer, as likewise the Mean Dry and Wet Bulb Thermometers are derived from the observations made at the several hours during the month.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1859.*

Hourly Means, &c. of the Observations and of the Hygrometrical elements  
dependent thereon.—(Continued.)

| Hour.      | Mean Wet Bulb Thermometer. | Dry Bulb above Wet. | Computed Dew point. | Dew Bulb above Dew point. | Mean elastic force of Vapour. | Mean Weight of Vapour in a Cubic foot of Air. | Additional weight of vapour required for complete saturation. | Mean degree of humidity, complete saturation being unity. |
|------------|----------------------------|---------------------|---------------------|---------------------------|-------------------------------|-----------------------------------------------|---------------------------------------------------------------|-----------------------------------------------------------|
|            | o                          | o                   | o                   | o                         | Inches.                       | Troy grs.                                     | Troy grs.                                                     |                                                           |
| Mid-night. | 61.7                       | 3.3                 | 59.7                | 5.3                       | 0.518                         | 5.76                                          | 1.11                                                          | 0.84                                                      |
| 1          | 61.2                       | 3.0                 | 59.1                | 5.1                       | .508                          | .65                                           | .04                                                           | .85                                                       |
| 2          | 60.6                       | 2.9                 | 58.6                | 4.9                       | .499                          | .56                                           | 0.99                                                          | .85                                                       |
| 3          | 60.0                       | 2.9                 | 58.0                | 4.9                       | .489                          | .45                                           | .98                                                           | .85                                                       |
| 4          | 59.7                       | 2.7                 | 57.8                | 4.6                       | .486                          | .43                                           | .90                                                           | .86                                                       |
| 5          | 59.3                       | 2.7                 | 57.4                | 4.6                       | .480                          | .36                                           | .89                                                           | .86                                                       |
| 6          | 59.0                       | 2.5                 | 57.2                | 4.3                       | .476                          | .33                                           | .83                                                           | .87                                                       |
| 7          | 58.7                       | 2.4                 | 56.8                | 4.3                       | .470                          | .27                                           | .81                                                           | .87                                                       |
| 8          | 61.2                       | 3.4                 | 59.2                | 5.4                       | .509                          | .67                                           | 1.11                                                          | .84                                                       |
| 9          | 62.8                       | 5.1                 | 59.7                | 8.2                       | .518                          | .73                                           | .78                                                           | .76                                                       |
| 10         | 61.0                       | 6.8                 | 60.6                | 10.2                      | .534                          | .86                                           | 2.34                                                          | .72                                                       |
| 11         | 65.3                       | 8.4                 | 61.1                | 12.6                      | .543                          | .92                                           | 3.04                                                          | .66                                                       |
| Noon.      | 66.2                       | 10.0                | 61.2                | 15.0                      | .544                          | .92                                           | .74                                                           | .61                                                       |
| 1          | 66.7                       | 11.3                | 61.0                | 17.0                      | .541                          | .85                                           | 4.34                                                          | .57                                                       |
| 2          | 67.1                       | 11.8                | 61.2                | 17.7                      | .544                          | .88                                           | .59                                                           | .56                                                       |
| 3          | 67.1                       | 12.0                | 61.1                | 18.0                      | .543                          | .86                                           | .67                                                           | .56                                                       |
| 4          | 66.1                       | 11.0                | 60.6                | 16.5                      | .534                          | .78                                           | .14                                                           | .58                                                       |
| 5          | 66.2                       | 9.1                 | 61.6                | 13.7                      | .552                          | 6.00                                          | 3.40                                                          | .64                                                       |
| 6          | 66.3                       | 6.6                 | 63.0                | 9.9                       | .578                          | .32                                           | 2.41                                                          | .72                                                       |
| 7          | 65.4                       | 5.2                 | 62.8                | 7.8                       | .574                          | .31                                           | 1.84                                                          | .77                                                       |
| 8          | 64.5                       | 4.5                 | 62.2                | 6.8                       | .563                          | .20                                           | .56                                                           | .80                                                       |
| 9          | 63.7                       | 4.1                 | 61.2                | 6.6                       | .544                          | .01                                           | .47                                                           | .80                                                       |
| 10         | 63.0                       | 3.8                 | 60.7                | 6.1                       | .536                          | 5.93                                          | .33                                                           | .82                                                       |
| 11         | 62.4                       | 3.5                 | 60.3                | 5.6                       | .528                          | .86                                           | .20                                                           | .83                                                       |

All the Hygrometrical elements are computed by the Greenwich Constants.

*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1859.*

Solar Radiation, Weather, &c.

| Date. | Max. Solar radiation. | Rain Gauge 5 feet above Ground. | Prevailing direction of the Wind. | General Aspect of the Sky.                                                                     |
|-------|-----------------------|---------------------------------|-----------------------------------|------------------------------------------------------------------------------------------------|
|       | o                     | Inches.                         |                                   |                                                                                                |
| 1     | 134.0                 | ..                              | N. W. & N.                        | Cloudless.                                                                                     |
| 2     | <i>Sunday.</i>        |                                 |                                   |                                                                                                |
| 3     | 131.0                 | ..                              | N.                                | Cloudless till 6 A. M. Scatd. $\searrow$ i and $\swarrow$ i till 4 P. M. cloudless afterwards. |
| 4     | 125.7                 | ..                              | N. & N. W. & E.                   | Cloudless till 5 A. M. Scatd. $\swarrow$ i till 6 P. M. cloudless afterwards.                  |
| 5     | ..                    | ..                              | N. W. & N. & W.                   | Cloudless till 5 A. M. Scatd. clouds afterwards.                                               |
| 6     | ...                   | ..                              | N. & W.                           | Cloudy till 6 P. M. cloudless afterwards.                                                      |
| 7     | 137.8                 | ..                              | N. & N. W.                        | Cloudless.                                                                                     |
| 8     | 134.2                 | ..                              | W. & N.                           | Cloudless.                                                                                     |
| 9     | <i>Sunday.</i>        |                                 |                                   |                                                                                                |
| 10    | 133.7                 | ..                              | N.                                | Cloudless.                                                                                     |
| 11    | 135.2                 | ..                              | N. & S.                           | Cloudless.                                                                                     |
| 12    | 136.0                 | ..                              | S. W. & S.                        | Cloudless.                                                                                     |
| 13    | 133.6                 | ..                              | N. W. & N.                        | Cloudless.                                                                                     |
| 14    | 135.0                 | ..                              | N. W. & N. & W.                   | Cloudless.                                                                                     |
| 15    | 136.0                 | ..                              | W. & N. W.                        | Cloudless.                                                                                     |
| 16    | <i>Sunday.</i>        |                                 |                                   |                                                                                                |
| 17    | 133.0                 | ..                              | N. W. & W. & N.                   | Scatd. $\swarrow$ i till 11 A. M. cloudless afterwards.                                        |
| 18    | 138.0                 | ..                              | W. & N.                           | Cloudless.                                                                                     |
| 19    | 138.0                 | ..                              | N. W. & N.                        | Cloudless.                                                                                     |
| 20    | 140.0                 | ..                              | S. W. & E.                        | Cloudless.                                                                                     |
| 21    | 132.0                 | ..                              | N. W. & W.                        | Cloudless.                                                                                     |
| 22    | 138.2                 | ..                              | N. W. & W. & N.                   | Cloudless.                                                                                     |
| 23    | <i>Sunday.</i>        |                                 |                                   |                                                                                                |
| 24    | 141.0                 | ..                              | W. & N.                           | Cloudless till 3 P. M. Scatd. $\searrow$ i and $\swarrow$ i till 8 P. M. cloudless afterwards. |
| 25    | 138.0                 | ..                              | W. & S. W.                        | Cloudless.                                                                                     |
| 26    | 140.0                 | ..                              | S. W. & N. W.                     | Cloudless.                                                                                     |
| 27    | 138.5                 | ..                              | N. & S. W.                        | Cloudless.                                                                                     |
| 28    | 137.0                 | ..                              | W.                                | Cloudless.                                                                                     |
| 29    | 143.0                 | ..                              | W. & E.                           | Cloudless.                                                                                     |
| 30    | <i>Sunday.</i>        |                                 |                                   |                                                                                                |
| 31    | 138.0                 | ..                              | W. & S.                           | Cloudless.                                                                                     |

$\searrow$ i Cirri,  $\swarrow$ i cirro strati,  $\cup$ i cumuli,  $\sim$ i cumulo strati,  $\searrow$ -i nimbi, —i strati,  $\swarrow$ i cirro cumuli.



*Abstract of the Results of the Hourly Meteorological Observations  
taken at the Surveyor General's Office, Calcutta,  
in the month of January, 1859.*

## MONTHLY RESULTS.

|                                                                       | Inches. |
|-----------------------------------------------------------------------|---------|
| Mean height of the Barometer for the month, .. ..                     | 30.002  |
| Max. height of the Barometer, occurred at 10 A. M. on the 11th, .. .. | 30.163  |
| Min. height of the Barometer, occurred at 4 P. M. on the 26th, .. ..  | 29.851  |
| <i>Extreme Range</i> of the Barometer during the month, .. ..         | 0.312   |
| Mean of the Daily Max. Pressures, .. ..                               | 30.085  |
| Ditto ditto Min. ditto, .. ..                                         | 29.945  |
| <i>Mean Daily range</i> of the Barometer during the month, .. ..      | 0.140   |

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|                                                                    | °    |
|--------------------------------------------------------------------|------|
| Mean Dry Bulb Thermometer for the month, .. ..                     | 69.1 |
| Max. Temperature, occurred at 3 P. M. on the 31st, .. ..           | 85.2 |
| Min. Temperature, occurred at 6 and 7 A. M. on the 22nd, .. ..     | 57.0 |
| <i>Extreme Range</i> of the Temperature during the month, .. ..    | 28.2 |
| Mean of the Daily Max. Temperature, .. ..                          | 79.2 |
| Ditto ditto Min. ditto, .. ..                                      | 61.1 |
| <i>Mean Daily range</i> of the Temperature during the month, .. .. | 18.1 |

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|                                                                  | °                |
|------------------------------------------------------------------|------------------|
| Mean Wet Bulb Thermometer for the month, .. ..                   | 63.3             |
| Mean Dry Bulb Thermometer above Mean Wet Bulb Thermometer, .. .. | 5.8              |
| Computed Mean Dew Point for the month, .. ..                     | 60.4             |
| Mean Dry Bulb Thermometer above computed Mean Dew Point, .. ..   | 8.7              |
| Mean Elastic force of vapour for the month, .. ..                | Inches.<br>0.530 |

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|                                                                               | Troy grains. |
|-------------------------------------------------------------------------------|--------------|
| Mean weight of vapour for the month, .. ..                                    | 5.84         |
| Additional weight of vapour required for complete saturation, .. ..           | 1.94         |
| Mean degree of Humidity for the month, complete saturation being unity, .. .. | 0.75         |

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|                                                         | Inches.         |
|---------------------------------------------------------|-----------------|
| Rained No day. Max. fall of rain during 24 hours, .. .. | Nil.            |
| Total amount of rain during the month, .. ..            | Nil.            |
| Prevailing direction of the Wind, .. ..                 | W. & N. & N. W. |

*Abstract of the Results of the Hourly Meteorological Observations taken at the Surveyor General's Office, Calcutta, in the month of January, 1859.*

MONTHLY RESULTS.

Table showing the number of days on which at a given hour any particular wind blew, together with the number of days on which at the same hour, when any particular wind was blowing, it rained.

| Hour.     | N.           | Rain on. | N. E. | Rain on. | E. | Rain on. | S. E. | Rain on. | S. | Rain on. | S. W. | Rain on. | W. | Rain on. | N. W. | Rain on | Calm. | Rain on. | Missed. |
|-----------|--------------|----------|-------|----------|----|----------|-------|----------|----|----------|-------|----------|----|----------|-------|---------|-------|----------|---------|
|           | No. of days. |          |       |          |    |          |       |          |    |          |       |          |    |          |       |         |       |          |         |
| Midnight. | 9            |          |       |          |    |          |       |          | 3  |          | 3     |          | 5  |          | 6     |         |       |          |         |
| 1         | 9            |          |       |          |    |          |       |          | 3  |          | 3     |          | 5  |          | 6     |         |       |          |         |
| 2         | 9            |          |       |          |    |          |       |          | 2  |          | 3     |          | 6  |          | 6     |         |       |          |         |
| 3         | 8            |          |       |          |    |          |       |          | 2  |          | 3     |          | 6  |          | 6     |         |       |          | 1       |
| 4         | 9            |          |       |          |    |          |       |          | 2  |          | 2     |          | 5  |          | 8     |         |       |          |         |
| 5         | 9            |          |       |          |    |          |       |          | 2  |          | 2     |          | 5  |          | 7     |         |       |          | 1       |
| 6         | 10           |          |       |          |    |          |       | 1        | 2  |          | 2     |          | 7  |          | 4     |         |       |          | 1       |
| 7         | 8            |          | 1     |          | 1  |          |       |          | 2  |          | 2     |          | 6  |          | 6     |         |       |          |         |
| 8         | 8            |          | 4     |          |    | 1        |       | 1        |    |          | 5     |          | 2  |          | 5     |         |       |          | 1       |
| 9         | 10           |          | 3     |          | 1  |          |       |          |    |          | 5     |          | 3  |          | 4     |         |       |          |         |
| 10        | 9            |          | 2     |          | 2  |          | 1     |          | 1  |          | 1     |          | 5  |          | 5     |         |       |          |         |
| 11        | 8            |          | 2     |          | 2  |          | 1     |          | 5  |          | 1     |          | 4  |          | 3     |         |       |          |         |
| Noon.     | 6            |          | 1     |          | 1  |          | 1     |          |    |          | 5     |          | 9  |          | 3     |         |       |          |         |
| 1         | 2            |          | 1     |          | 1  |          |       |          |    |          | 5     |          | 13 |          | 4     |         |       |          |         |
| 2         | 3            |          |       |          | 1  |          | 1     |          | 1  |          | 6     |          | 6  |          | 8     |         |       |          |         |
| 3         | 3            |          |       |          | 1  |          |       |          | 1  |          | 4     |          | 10 |          | 7     |         |       |          |         |
| 4         | 3            |          |       |          |    |          |       |          | 1  |          | 1     |          | 15 |          | 6     |         |       |          |         |
| 5         | 4            |          | 1     |          |    |          |       |          |    |          | 5     |          | 12 |          | 4     |         |       |          |         |
| 6         | 7            |          | 1     |          | 1  |          |       |          | 1  |          | 3     |          | 7  |          | 6     |         |       |          |         |
| 7         | 7            |          | 1     |          | 1  |          |       |          | 1  |          | 3     |          | 8  |          | 5     |         |       |          |         |
| 8         | 7            |          |       |          | 2  |          |       |          | 1  |          | 2     |          | 9  |          | 5     |         |       |          |         |
| 9         | 6            |          |       |          | 2  |          |       |          | 1  |          | 2     |          | 9  |          | 6     |         |       |          |         |
| 10        | 7            |          |       |          | 2  |          |       |          | 1  |          | 2     |          | 8  |          | 6     |         |       |          |         |
| 11        | 7            |          |       |          | 2  |          |       |          | 1  |          | 2     |          | 7  |          | 6     |         |       |          | 1       |

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